ROBOTICS

Product specification

IRB 1200

Trace back information:
Workspace 24C version a5
Checked in 2024-09-17
Skribenta version 5.5.019

Product specification

IRB 1200-5/0.9
IRB 1200-7/0.7
IRB 1200-7/0.9

OmniCore

Document ID: 3HAC081417-001

Revision: H

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Original instructions.

Table of contents

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Overview of this specification

About this product specification

This product specification describes the performance of the manipulator or a complete family of manipulators in terms of:

- The structure and dimensional prints
- The fulfilment of standards, safety, and operating equipment
- The load diagrams, mounting or extra equipment, the motion, and the robot reach
- The specification of available variants and options

The specification covers the manipulator using the OmniCore controller.

Usage

Product specifications are used to find data and performance about the product, for example to decide which product to buy. How to handle the product is described in the product manual.

The specification is intended for:

- Product managers and product personnel
- Sales and marketing personnel
- Order and customer service personnel
- Integrators and customers

References

Reference	Document ID
Product manual - IRB 1200	*3HAC046983-001*
Product manual, spare parts - IRB 1200	*3HAC046984-001*
Product specification - OmniCore C line	*3HAC065034-001*
Product specification - OmniCore E line	*3HAC079823-001*
Product manual - OmniCore C30	*3HAC060860-001*
Product manual - OmniCore C30 Type A	*3HAC089064-001*
Product manual - OmniCore C90XT Type A	*3HAC089065-001*
Product manual - OmniCore E10	*3HAC079399-001*

Revisions

Revision	Description
A	First edition.
B	Published in release 22A. The following updates are done in this revision: • IRB 1200 Hygienic supported working with OmniCore controllers. • Hygienic option [3353-1] added. • Added screwing depth information to attachment screws for robot foundation.
C	Published in release 22B. The following updates are done in this revision: • IRB 1200 supported working with OmniCore E10 controllers.

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Continued

Revision	Description
D	Published in release 22C. The following updates are done in this revision: • Updated the limitation of option [3303-1] Parallel & Air.
E	Published in release 23D. The following updates are done in this revision: • New variant IRB 1200-7/0.9 added. • New option ABB orange standard [209-1] added.
F	Published in release 24A. The following updates are done in this revision: • Updated information about protection classes.
G	Published in release 24B. The following updates are done in this revision: • Added the robot stopping distances. These data was previously part of a separate document. The data for OmniCore robots is now included in this specification.
H	Published in release 24C. The following updates are done in this revision: • IRB 1200-7/0.9 supported working with OmniCore C line controllers. • Updated power consumption and performance data for IRB 1200-7/0.9.

1 Description

1.1 Structure

1.1.1 Introduction to structure

General

The IRB 1200 is one of ABB Robotics latest generation of 6-axis industrial robot, with a payload of 5 to 7 kg, designed specifically for manufacturing industries that use flexible robot-based automation, e.g. 3C industry. The robot has an open structure that is especially adapted for flexible use, and can communicate extensively with external systems.

Clean room robots

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Particle emission from the robot fulfill Clean room class 3 standard according to DIN EN ISO 14644-1.

Clean room robots are specially designed to work in a clean room environment.

According to IPA test result, the robot IRB 1200 is suitable for use in clean room environments.

Clean room robots are designed in order to prevent from particle emission from the robot. For example is, frequent maintenance work possible to perform without cracking the paint. The robot is painted with four layers of polyurethane paint. The last layer being a varnish over labels in order to simplify cleaning. The paint has been tested regarding outgassing of Volatile Organic Compounds (VOC) and been classified in accordance with ISO 14644-8.

Classification of airborne molecular contamination, see below:

Parameter				Outgassing amount		
Area (m^2)	Test duration (s)	Temp (°C)	Performed test	Total detected (ng)	Normed based on $1m^2$ and 1s(g)	Classification in accordance to ISO 14644-8
4.5E-03	3600	23	TVOC	2848	1.7E-07	-6.8
4.5E-03	60	90	TVOC	46524	1.7E-04	-3.8

Classification results in accordance with ISO 14644-8 at different test temperatures.

Continues on next page

1.1.1 Introduction to structure
Continued

Food grade lubrication

The robot has food grade lubrication (NSF H1) as an option.

The protection type for robots with food grade lubrication requires Hygiene 67 [3353-1].

Note

The protection type for robots with food grade lubrication is not available for IRB 1200-7/0.9 [3300-117].

Hygienic

The robot has Hygienic as an option. Robots with the option Hygienic are equipped with special sealings and coatings, and a special axes 6 stainless steel body and tool flange. The protection type for robot with hygienic is Food grade lubrication, IP67, IP69k (max.30bar) on axis 6 flange.

Note

The protection type for robots with hygienic is not available for IRB 1200-7/0.9 [3300-117].

IP67/66 protection

The robot has IP67 as an option. The option will add sealing, machining parts and gasket.

Protection type Foundry Plus 2

Robots with the option Foundry Plus 2 are designed for harsh environments where the robot is exposed to sprays of coolants, lubricants and metal spits that are typical for die casting applications or other similar applications.

Typical applications are spraying insertion and part extraction of die-casting machines, handling in sand casting and gravity casting, etc. (Please refer to Foundry Prime robots for washing applications or other similar applications). Special care must be taken in regard to operational and maintenance requirements for applications in foundry are as well as in other applications areas. Please contact ABB Robotics Sales organization if in doubt regarding specific application feasibility for the Foundry Plus 2 protected robot.

The robot is painted with two-component epoxy on top of a primer for corrosion protection. To further improve the corrosion protection additional rust preventive are applied to exposed and crucial areas, e.g. has the tool flange a special preventive coating. Although, continuous splashing of water or other similar rust formation fluids may cause rust attach on the robots unpainted areas, joints, or other unprotected surfaces. Under these circumstances it is recommended to add rust inhibitor to the fluid or take other measures to prevent potential rust formation on the mentioned.

The entire robot is IP67 compliant according to IEC 60529 - from base to wrist, which means that the electrical compartments are sealed against water and solid

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contaminants. Among other things all sensitive parts are better protected than the standard offer.

Selected Foundry Plus 2 features:

- Improved sealing to prevent penetration into cavities to secure IP67
- Additional protection of cabling and electronics
- Special covers that protect cavities
- Well-proven connectors
- Nickel coated tool flange
- Rust preventives on screws, washers and unpainted/machined surfaces
- Extended service and maintenance program

The Foundry Plus 2 robot can be cleaned with appropriate washing equipment according to the robot product manual. Appropriate cleaning and maintenance is required to maintain the protection, for example can rust preventive be washed off with wrong cleaning method.

Available robot variants

The option Foundry Plus 2 might not be available for all robot variants.

See *Specification of variants and options on page 91* for robot versions and other options not selectable together with Foundry Plus 2.

Operating system

The robot is equipped with the OmniCore C30/C90XT/E10 controller and robot control software, RobotWare. RobotWare supports every aspect of the robot system, such as motion control, development and execution of application programs, communication etc. See *Operating manual - OmniCore*.

Safety

The safety standards are valid for the complete robot, manipulator and controller.

Additional functionality

For additional functionality, the robot can be equipped with optional software for application support - for example gluing and welding, communication features - network communication - and advanced functions such as multitasking, sensor control etc. For a complete description on optional software, see *Product specification - OmniCore C line* and *Product specification - OmniCore E line*.

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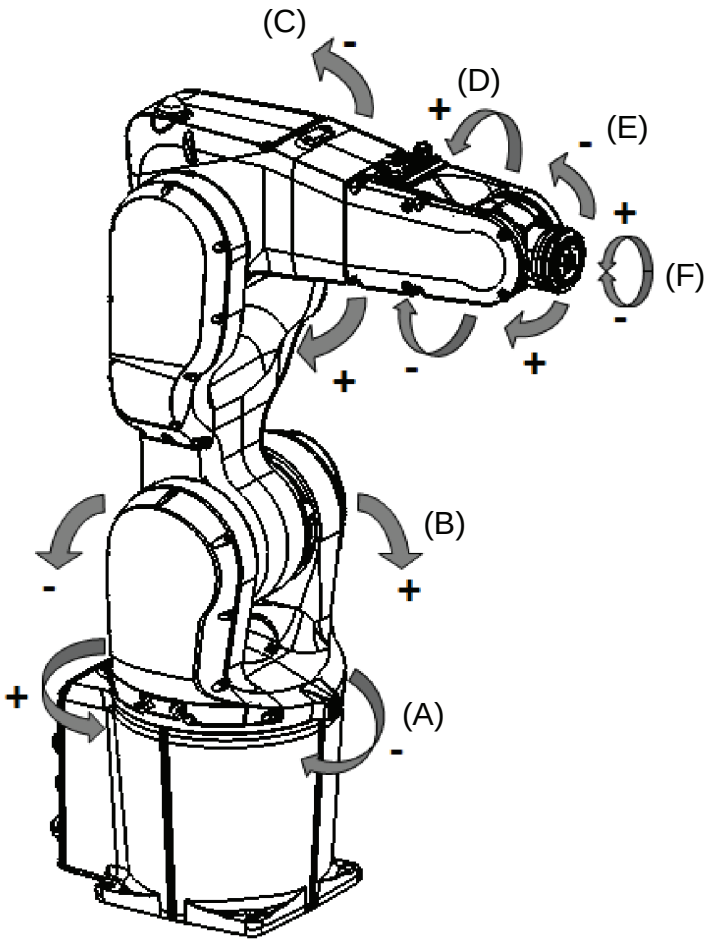
1.1.1 Introduction to structure
Continued

Manipulator axes



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Position	Description	Position	Description
A	Axis 1	B	Axis 2
C	Axis 3	D	Axis 4
E	Axis 5	F	Axis 6

1.1.2 The robot

General

The IRB 1200 is available in three versions and both can be mounted on floor, inverted or on wall in any angle (around X-axis or Y-axis).

Robot type	Handling capacity (kg)	Reach (m)
IRB 1200	5 kg	0.9 m
IRB 1200	7 kg	0.7 m
IRB 1200	7 kg	0.9 m

Weight, robot

The table shows the weight of the robot.

Robot model	Weight
IRB 1200	IRB 1200-5/0.9: 54 kg IRB 1200-7/0.7: 52 kg IRB 1200-7/0.9: 54 kg

Note

The weight does not include tools and other equipment fitted on the robot.

Mounting positions

The table shows valid mounting positions and the installation (mounting) angle for the manipulator.

Mounting position	Installation angle
Floor mounted	Any angle
Wall mounted	Any angle
Suspended	Any angle
Tilted	Any angle The limit for the maximum payload on the robot is reduced if the robot is tilted from 0°. Contact ABB for further information about acceptable loads.

Note

The actual mounting angle must always be configured in the system parameters, otherwise the performance and lifetime is affected. See the product manual for details.

Other technical data

Data	Description	Note
Airborne noise level	The sound pressure level outside	< 70 dB (A) Leq (acc. to the working space Machinery directive 2006/42/EG)

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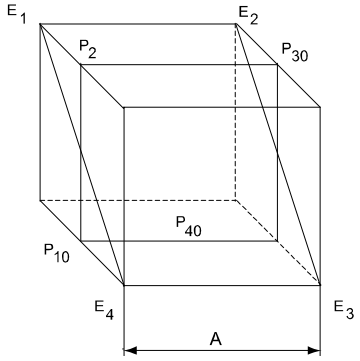
1.1.2 The robot
Continued

Power consumption

Type of movement	Controller type	Power consumption (kW)		
		IRB 1200-5/0.9	IRB 1200-7/0.7	IRB 1200-7/0.9
ISO Cube Max. velocity	With C30/C90XT	0.4 kW	0.36 kW	0.33 kW
	With E10	0.38 kW	0.36 kW	0.28 kW

Robot in 0 degree position	Controller type	IRB 1200-5/0.9	IRB 1200-7/0.7	IRB 1200-7/0.9
Brakes engaged	With C30/C90XT	0.08 kW	0.07 kW	0.10 kW
	With E10	0.07 kW	0.07 kW	0.06 kW
Brakes disengaged	With C30/C90XT	0.18 kW	0.18 kW	0.23 kW
	With E10	0.18 kW	0.17 kW	0.19 kW



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Position	Description
A	250 mm

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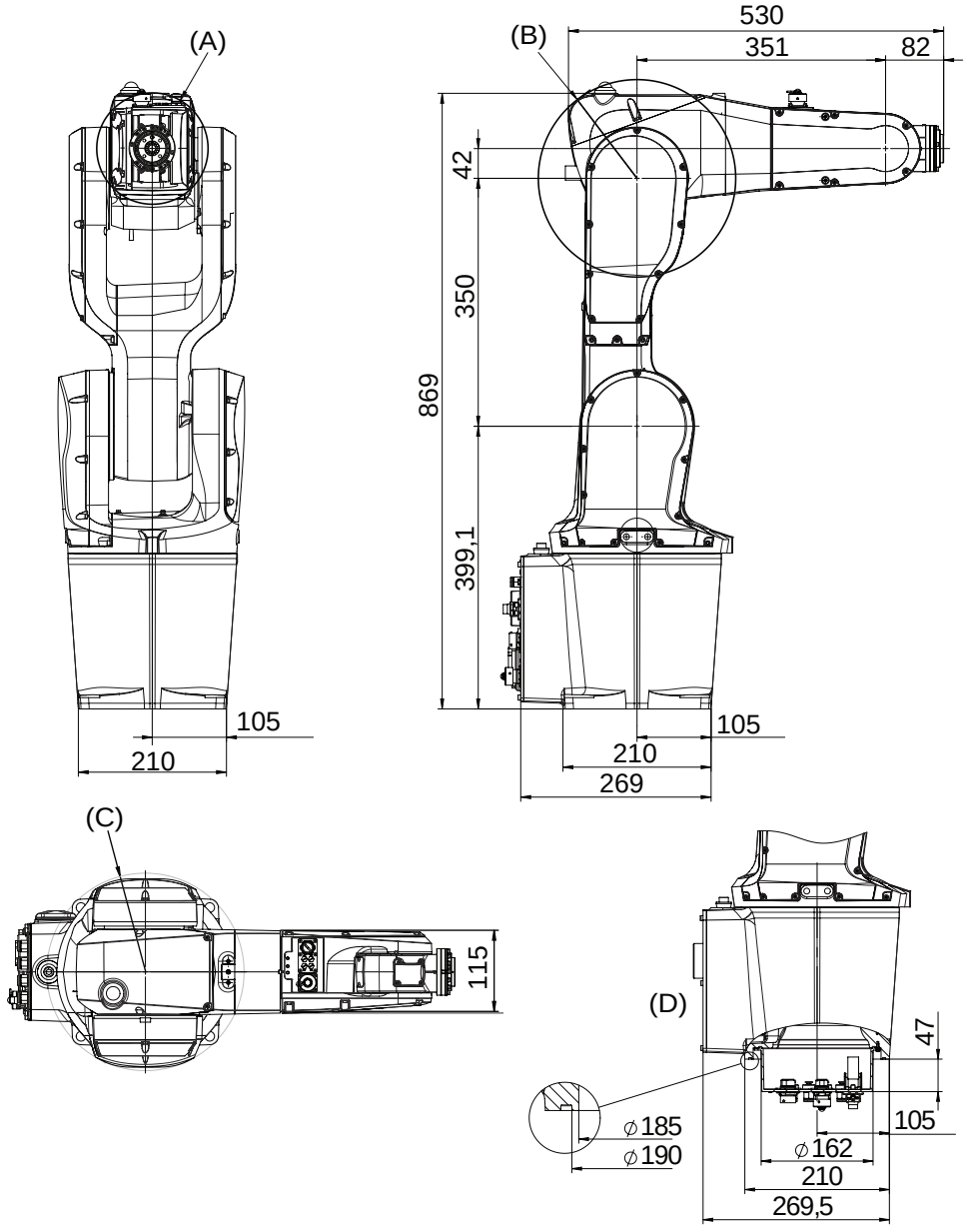
Dimensions IRB 1200-7/0.7

For robots in protection type IP67, Foundry Plus, Clean Room



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Position	Description
A	Minimum turning radius axis 4 R=79 mm
B	Minimum turning radius axis 3 R=139 mm
C	Minimum turning radius axis 1 R=138 mm
D	Valid for option Robot cabling routing, 3309-1 From below

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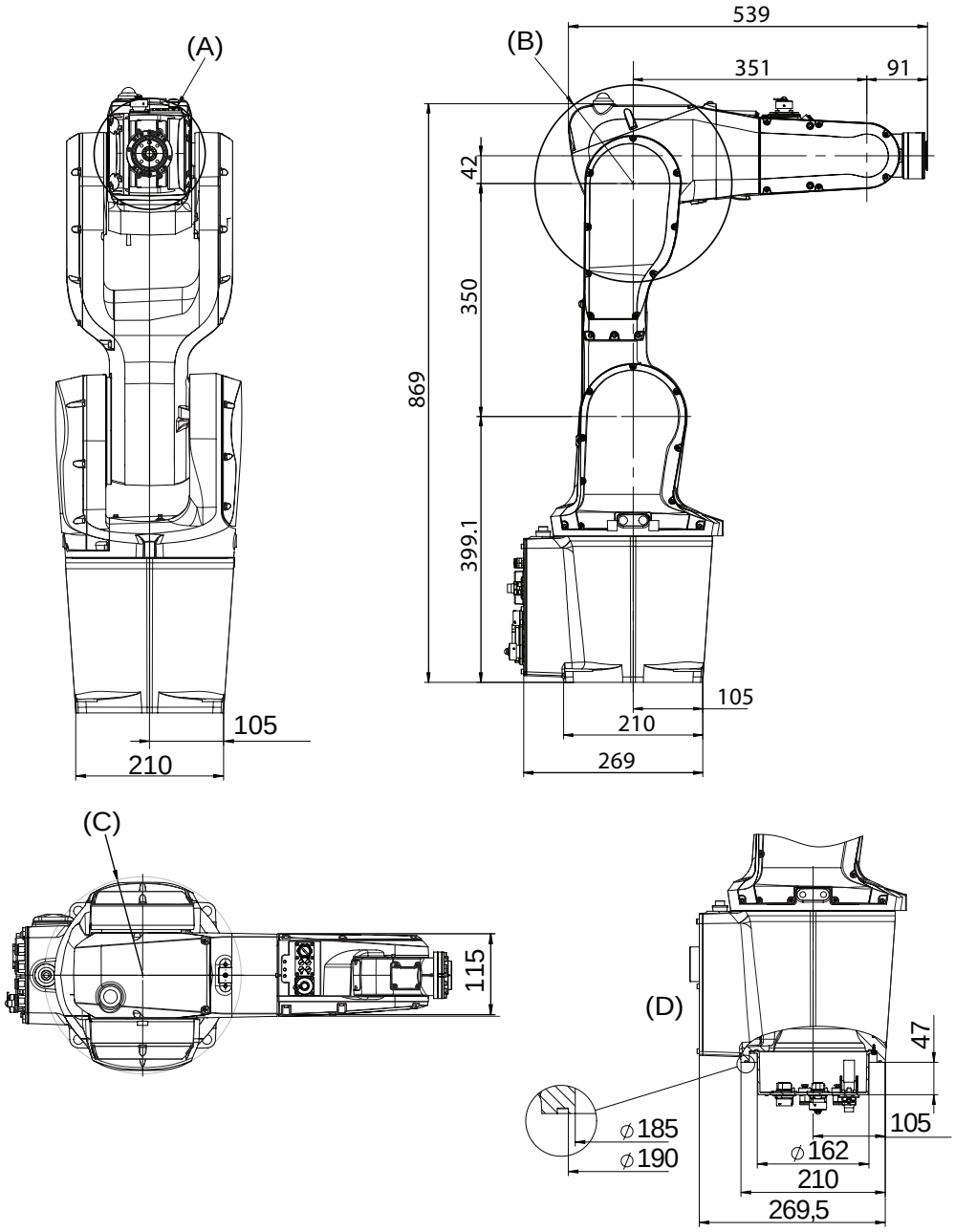
1.1.2 The robot
Continued

For robots in protection type Hygienic



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Position	Description
A	Minimum turning radius axis 4 R=79 mm
B	Minimum turning radius axis 3 R=139 mm
C	Minimum turning radius axis 1 R=138 mm
D	Valid for option Robot cabling routing, 3309-1 From below

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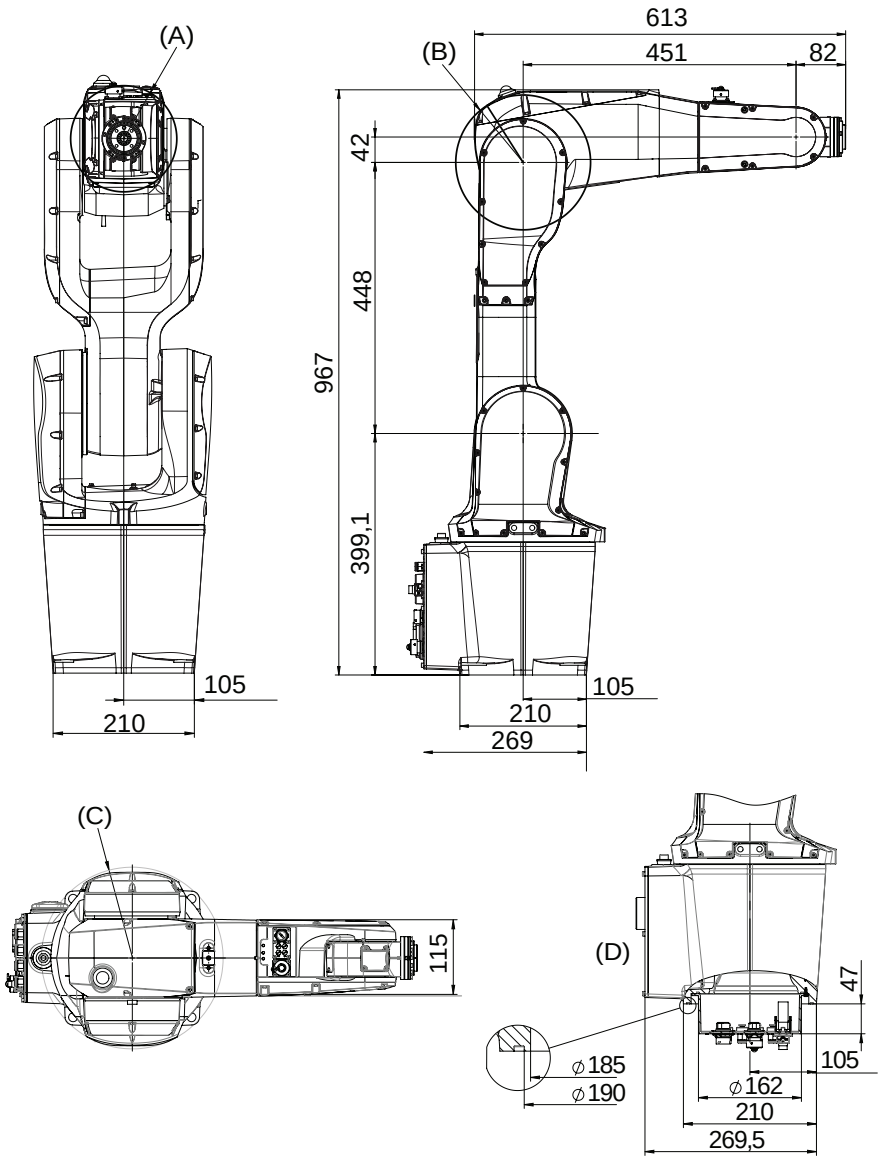
Dimensions IRB 1200-5/0.9

For robots in protection type IP67, Foundry Plus, Clean Room



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Pos	Description
A	Minimum turning radius axis 4 R=79 mm
B	Minimum turning radius axis 3 R=111 mm
C	Minimum turning radius axis 1 R=138 mm
D	Valid for option Robot cabling routing, 3309-1 From below

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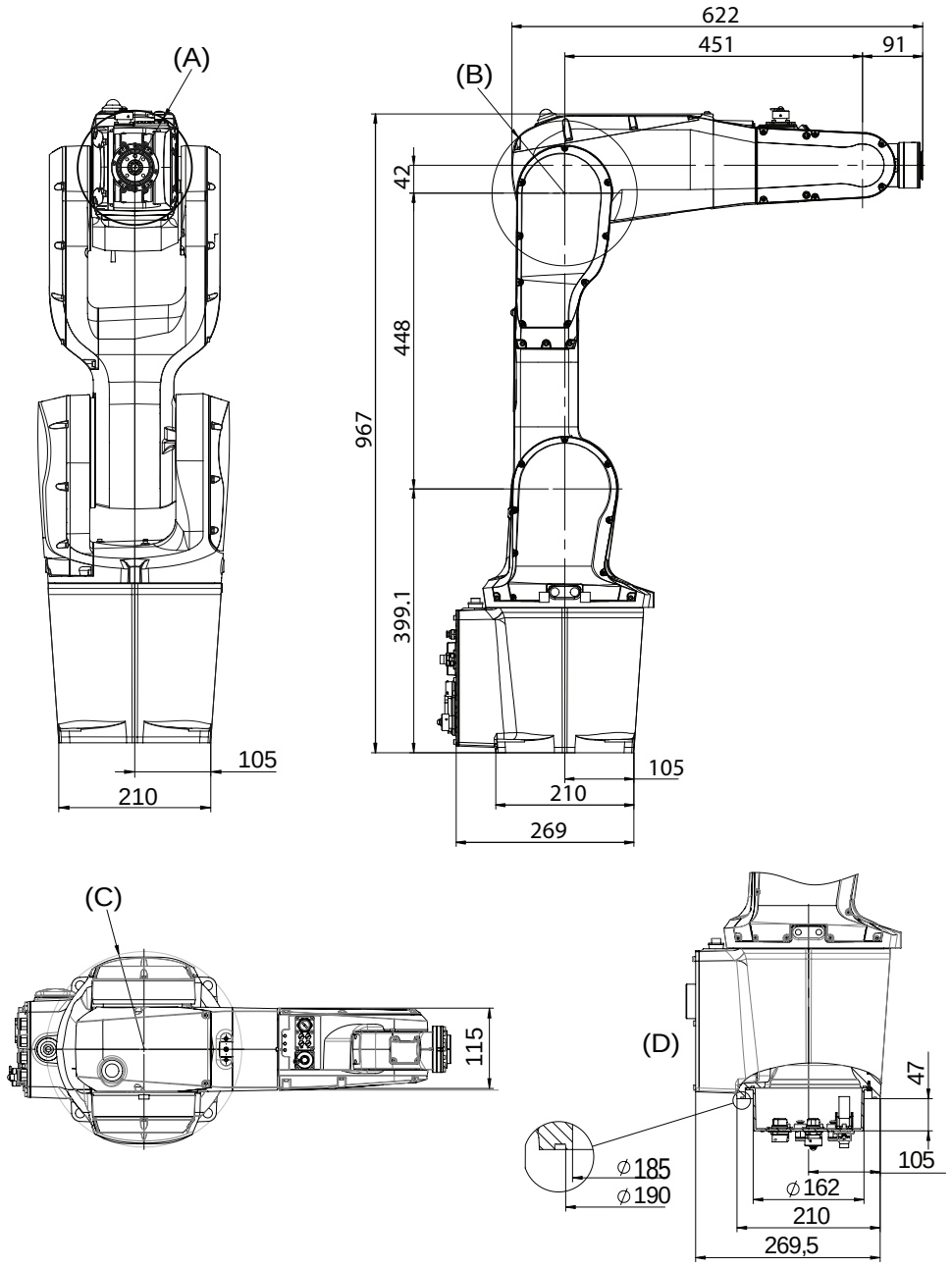
1.1.2 The robot
Continued

For robots in protection type Hygienic



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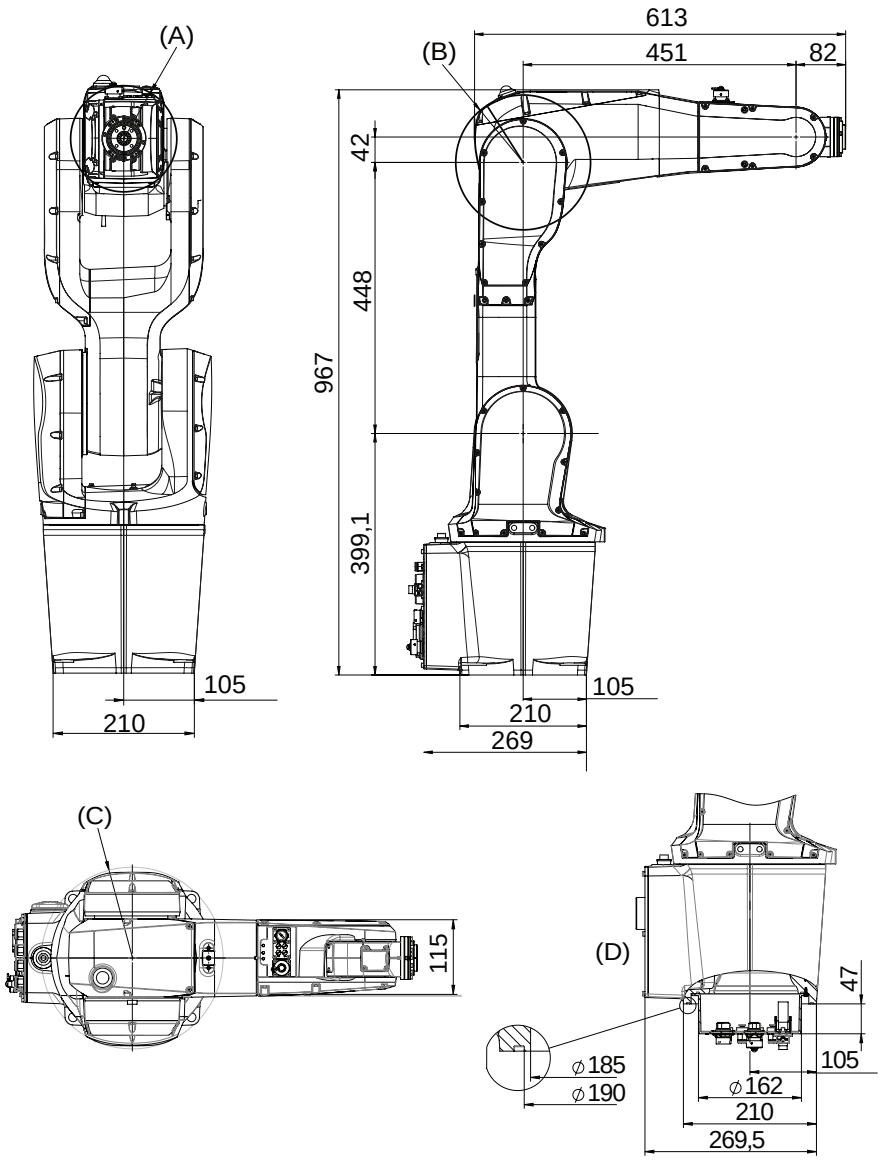
Position	Description
A	Minimum turning radius axis 4 R=79 mm
B	Minimum turning radius axis 3 R=139 mm
C	Minimum turning radius axis 1 R=138 mm
D	Valid for option Robot cabling routing, 3309-1 From below

Continues on next page

Dimensions IRB 1200-7/0.9

For robots in protection type IP67, Foundry Plus, Clean Room



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Pos	Description
A	Minimum turning radius axis 4 R=79 mm
B	Minimum turning radius axis 3 R=111 mm
C	Minimum turning radius axis 1 R=138 mm
D	Valid for option Robot cabling routing, 3309-1 From below

1.2 Standards

1.2.1 Applicable standards

General

The product is compliant with ISO 10218-1:2011, *Robots for industrial environments - Safety requirements - Part 1 Robots*, and applicable parts in the normative references, as referred to from ISO 10218-1:2011. In case of deviation from ISO 10218-1:2011, these are listed in the declaration of incorporation. The declaration of incorporation is part of the delivery.

Robot standards

Standard	Description
ISO 9283	Manipulating industrial robots – Performance criteria and related test methods
ISO 9787	Robots and robotic devices – Coordinate systems and motion nomenclatures
ISO 9946	Manipulating industrial robots – Presentation of characteristics

Other standards used in design

Standard	Description
IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements, normative reference from ISO 10218-1
IEC 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments
IEC 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
ISO 13849-1:2006	Safety of machinery - Safety related parts of control systems - Part 1: General principles for design, normative reference from ISO 10218-1
UL 1740 (option) CSA Z434 (option)	Standards For Safety - Robots and Robotic Equipment Industrial robots and robot Systems - General safety requirements Valid for USA and Canada.

1.3 Installation

1.3.1 Introduction to installation

General

IRB 1200 is adapted for normal industrial environment. Depending on robot variant, an end effector with max. weight of 5 or 7 kg, including payload, can be mounted on the robot's mounting flange (axis 6). Other equipment, weighing a maximum of 0.3 or 0.5 kg[1], can be mounted on the upper arm. For more information about mounting of extra equipment, see *Fitting of equipment on page 37*.

[1] For IRB 1200-5/0.9 and IRB 1200-7/0.7, the maximum arm load is 0.3 kg. For IRB 1200-7/0.9, the maximum arm load is 0.5 kg.

1.3.2 Operating requirements

Protection classes, robot

The table shows the available protection types of the robot, with the corresponding protection class.

Protection type	Protection class
Manipulator, protection type Standard	IP40 IP67 (option 3350-670, with OmniCore controllers)
Manipulator, protection type Foundry Plus	IP67 (option 3352-10, with OmniCore controllers)
Manipulator, protection type Clean Room	ISO Class 3 (option 3351-3, with OmniCore controllers)
Manipulator, protection type Hygienic	IP67 IP69K (max.30bar) on axis 6 flange

Explosive environments

The robot must not be located or operated in an explosive environment.

Working range limitations

No mechanical limitation.

Ambient temperature

Description	Protection class	Temperature
Manipulator during operation	Standard	+ 5°C [i] (41°F) to + 45°C (113°F)
Manipulator with food grade lubrication or Hygienic during operation	Option	+ 5°C [i] (41°F) to + 35°C [ii] (113°F)
For the controller	Standard/Option	See *Product specification - OmniCore C line* and *Product specification - OmniCore E line*.
Complete robot during transportation and storage	Standard	- 25°C (-13°F) to + 55°C (131°F)
For short periods (not exceeding 24 hours)	Standard	up to + 70°C (158°F)

i At low environmental temperature < 10ºC is, as with any other machine, a warm-up phase recommended to be run with the robot. Otherwise there is a risk that the robot stops or run with lower performance due to temperature dependent oil and grease viscosity.

ii For robots with food grade lubrication and Hygienic, if environment temperature > 35ºC, contact ABB for further information.

Relative humidity

Description	Relative humidity
Complete robot during operation, transportation and storage	Max. 95% at constant temperature

1.3.3 Mounting the manipulator

Maximum load

Maximum load in relation to the base coordination system. See Figure below.

Floor mounted

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	±910 N	±1620 N
Force z	-550 ±980 N	-550 ±1610 N
Torque xy	±570 Nm	±1550 Nm
Torque z	±280 Nm	±580 Nm

Wall mounted

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	±1210 N	±1940 N
Force z	0 ±900 N	0 ±1340 N
Torque xy	±700 Nm	±1650 Nm
Torque z	±300 Nm	±610 Nm

Suspended mounting

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	±910 N	±1620 N
Force z	+550 ±980 N	+550 ±1610 N
Torque xy	±570 Nm	±1550 Nm
Torque z	±280 Nm	±580 Nm

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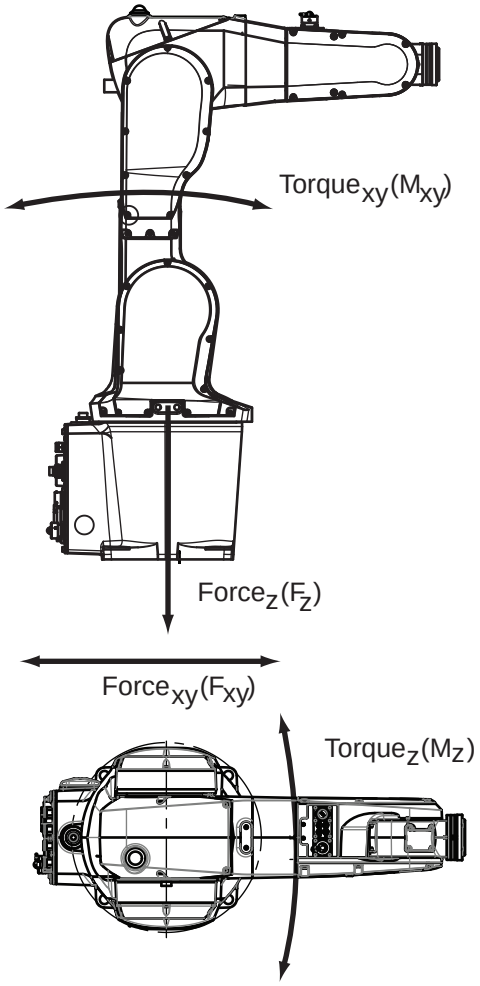
1.3.3 Mounting the manipulator
Continued



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Note regarding M_{xy} and F_{xy}

The bending torque (M_{xy}) can occur in any direction in the XY-plane of the base coordinate system.The same applies to the transverse force (F_{xy}).

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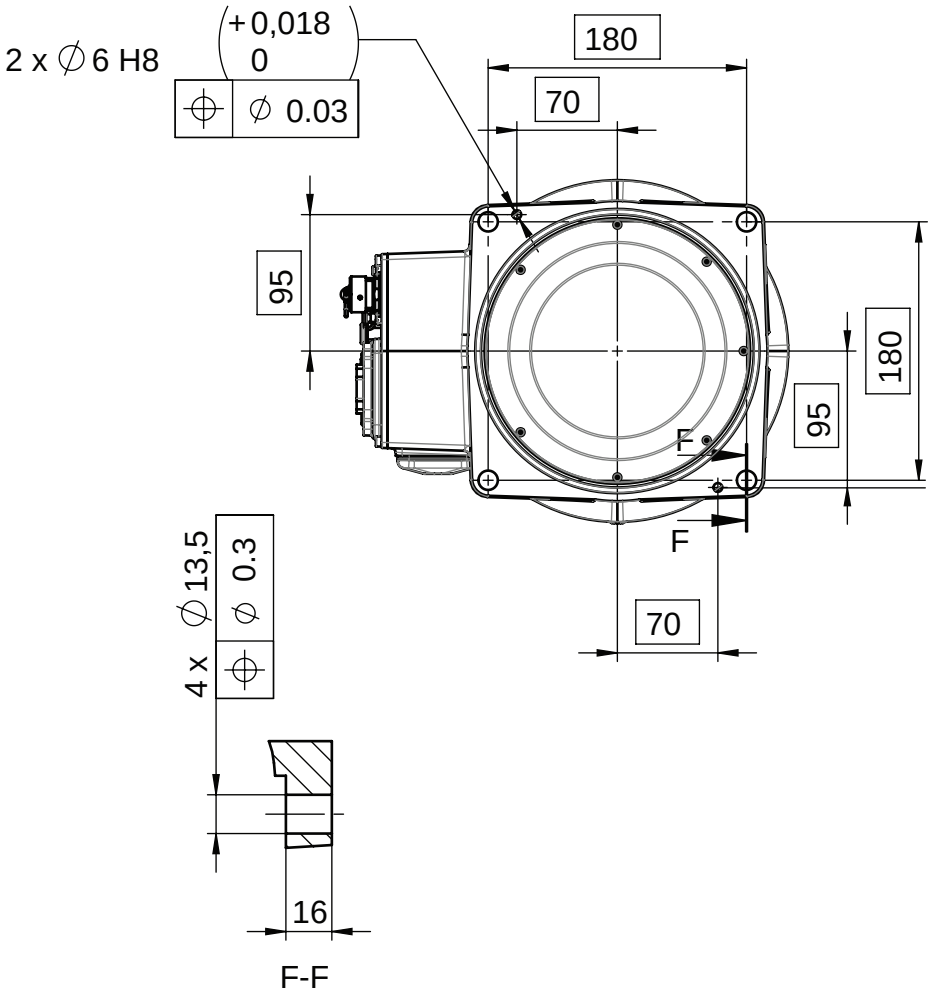
Fastening holes robot base

View from below.



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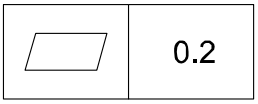
Attachment bolts, specification

The table specifies the type of securing screws and washers to be used to secure the robot directly to the foundation. It also specifies the type of pins to be used.

Suitable screws	M12x35 (robot installation directly on foundation)
Quantity	4 pcs
Quality	8.8
Suitable washer	13 x 20 x 2, steel hardness class 300HV
Guide pins	2 pcs, D6x20, ISO 2338 - 6m6x20 - A1
Tightening torque	55 Nm ± 5 Nm
Level surface requirements	 xx0900000643

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1.3.3 Mounting the manipulator
Continued

Screwing depth	Minimum 17 mm for ground with material yield strength 150 MPa

1.4 Load diagram

1.4.1 Introduction to load diagram

Information

WARNING

It is very important to always define correct actual load data and correct payload of the robot. Incorrect definitions of load data can result in overloading of the robot.

If incorrect load data is used, and/or if loads outside the load diagram are used, the following parts can be damaged due to overload:

- motors
- gearboxes
- mechanical structure

WARNING

In RobotWare, the service routine LoadIdentify can be used to determine correct load parameters. The routine automatically defines the tool and the load.

See *Operating manual - OmniCore*, for detailed information.

WARNING

Robots running with incorrect load data and/or with loads outside the load diagram, will not be covered by robot warranty.

General

The load diagram includes a nominal pay load inertia, J_0 of 0.06 kgm^2 and an extra load of 0.3 or 0.5 kg^2 at the upper arm housing. At different moment of inertia the load diagram will be changed. For robots that are allowed tilted, wall or inverted mounted, the load diagrams as given are valid and thus it is also possible to use RobotLoad within those tilt and axis limits.

Control of load case with RobotLoad

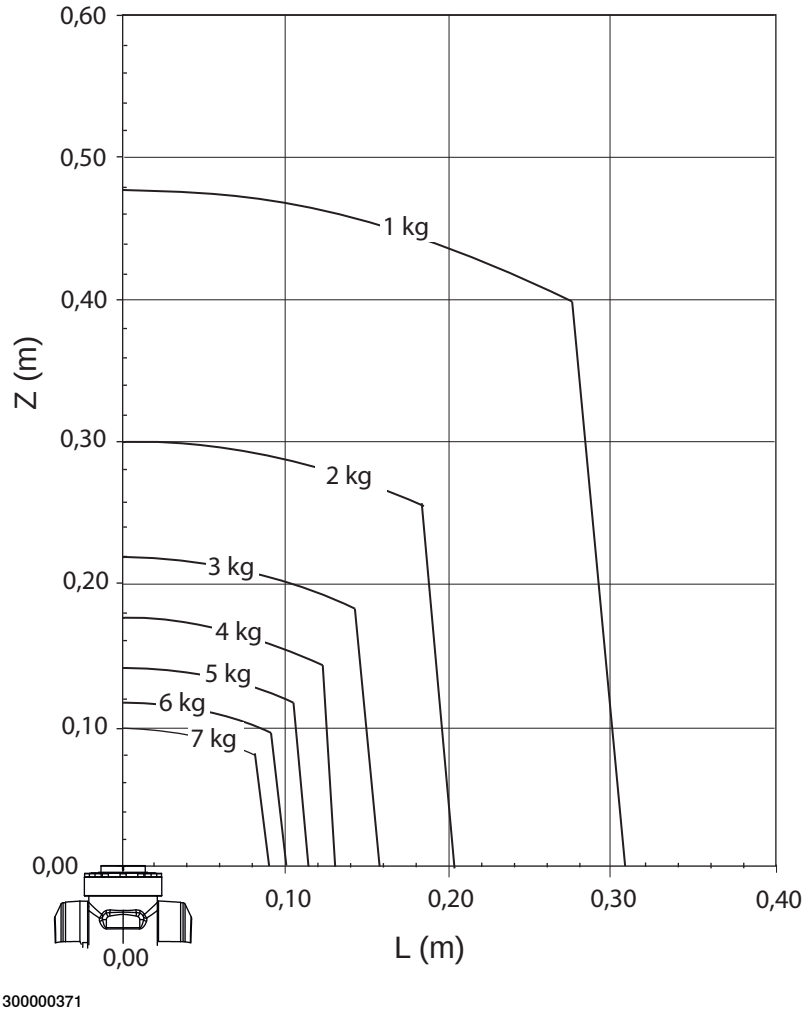
To verify a specific load case, use the RobotStudio add-in RobotLoad.

The result from RobotLoad is only valid within the maximum loads and tilt angles. There is no warning if the maximum permitted arm load is exceeded. For over-load cases and special applications, contact ABB for further analysis.

2 For IRB 1200-5/0.9 and IRB 1200-7/0.7, the maximum extra load is 0.3 kg. For IRB 1200-7/0.9, the maximum extra load is 0.5 kg.

1.4.2 Load diagram

IRB 1200 - 7/0.7



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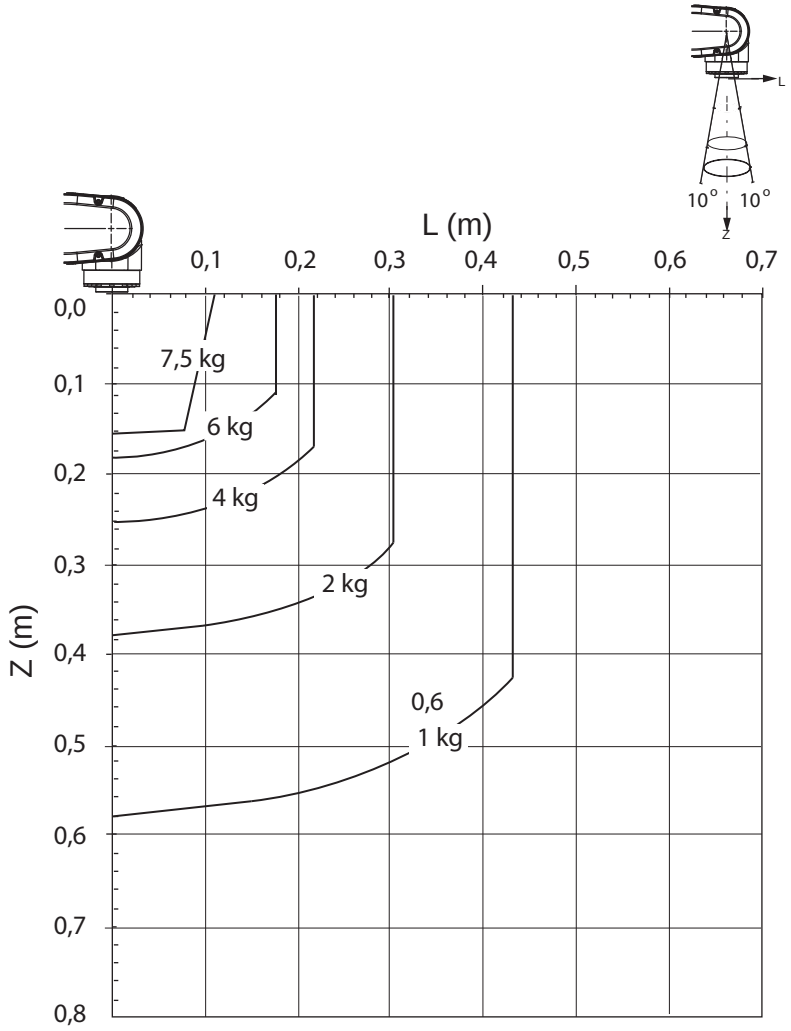
IRB 1200 - 7/0.7 "Vertical wrist" (± 10°)



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For wrist down (0° deviation from the vertical line).

	Description
Max load	7.5 kg
Z_{max}	0.159 m
L_{max}	0.109 m

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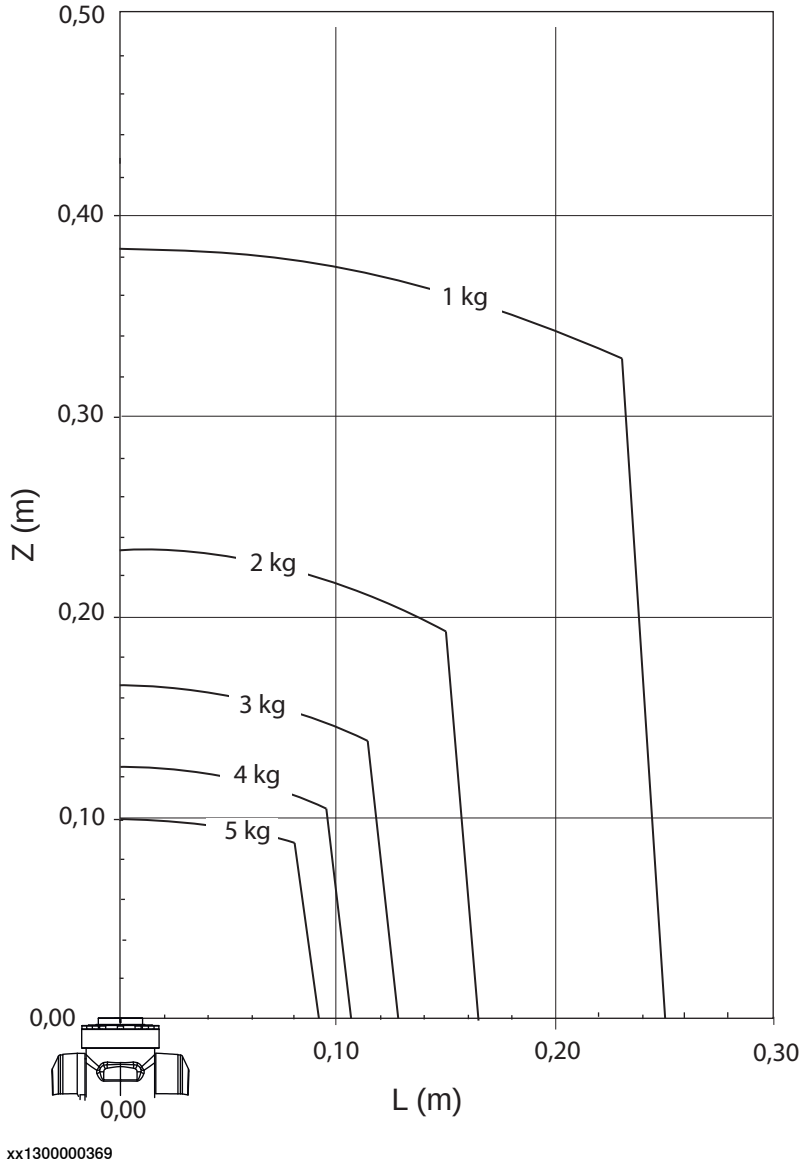
1.4.2 Load diagram
Continued

IRB 1200 - 5/0.9



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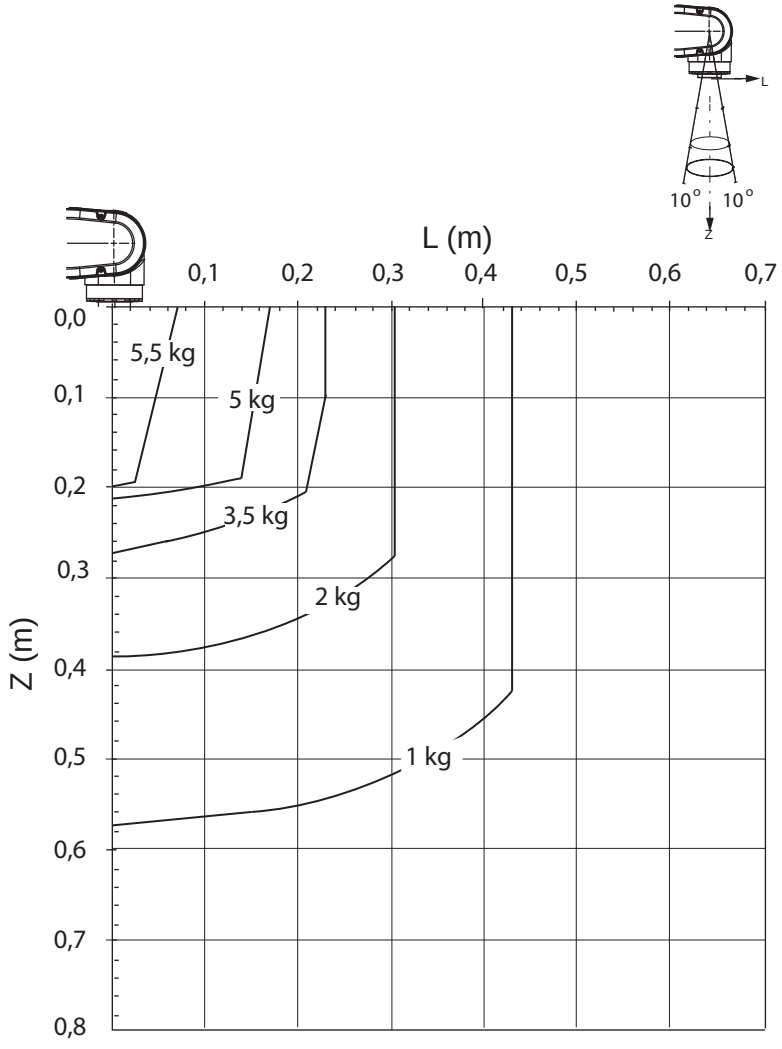
IRB 1200 - 5/0.9 "Vertical wrist" (± 10°)



xx1300000370

For wrist down (0° deviation from the vertical line).

	Description
Max load	5.5 kg
Z_{max}	0.199 m
L_{max}	0.069 m

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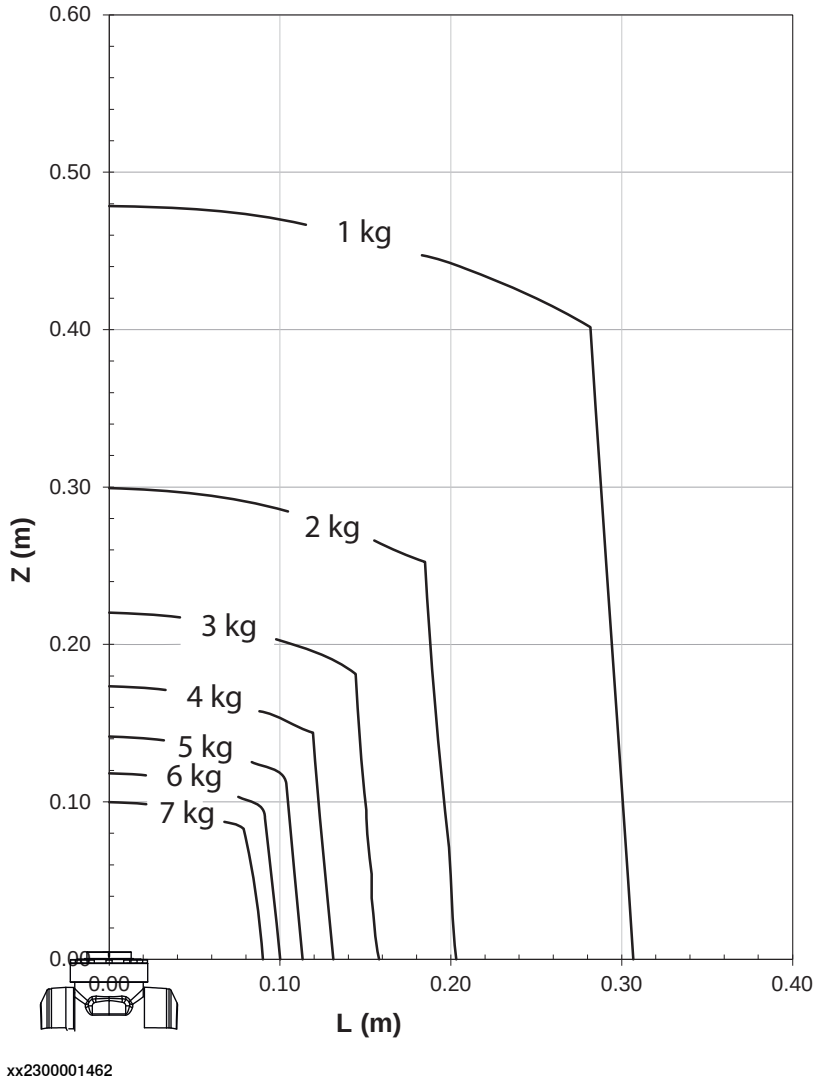
1.4.2 Load diagram
Continued

IRB 1200 - 7/0.9



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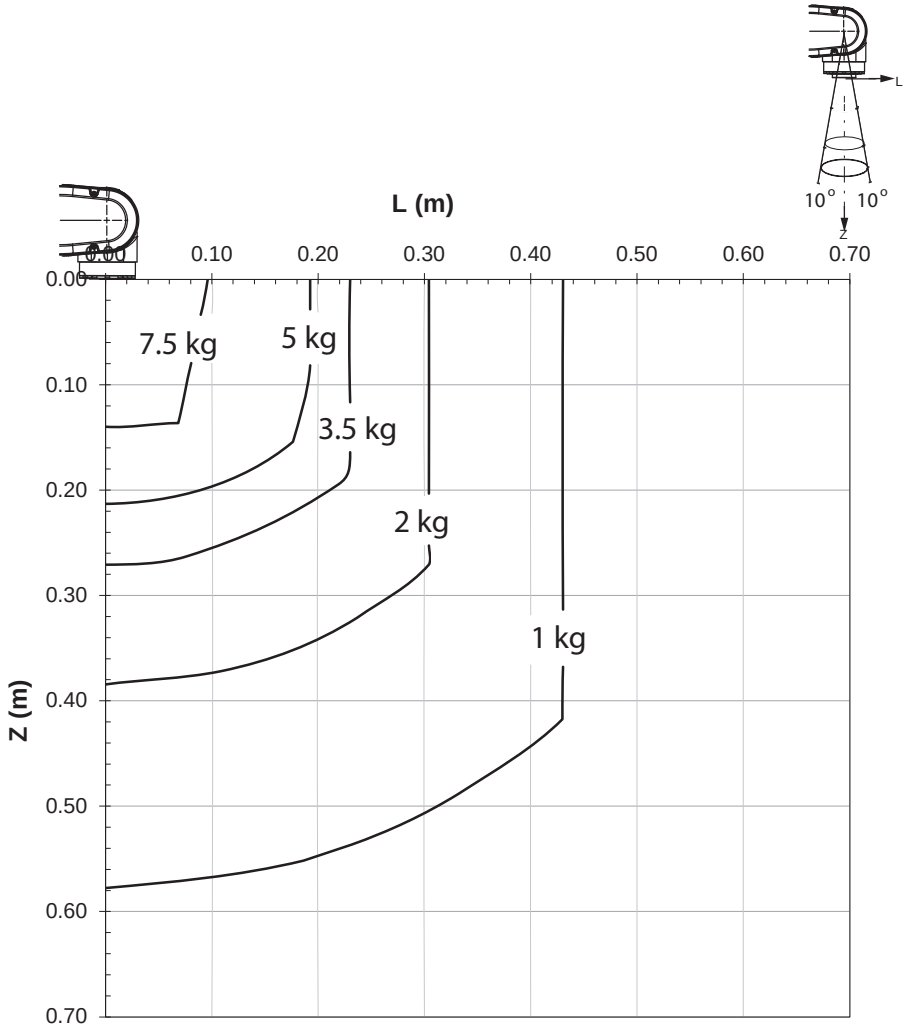
IRB 1200 - 7/0.9 "Vertical wrist" (± 10°)



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For wrist down (0° deviation from the vertical line).

	Description
Max load	7.5 kg
Z_{max}	0.140 m
L_{max}	0.096 m

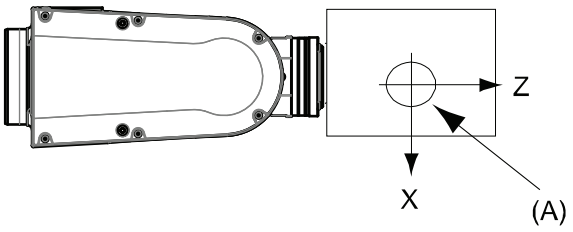
1.4.3 Maximum load and moment of inertia for axis 5

General

Total load given as: Mass in kg, center of gravity (Z and L) in m and moment of inertia (J_{ox}, J_{oy}, J_{ox}) in kgm^2. $L = \sqrt{(X2 + Y2)}$.

Full movement of Axis 5 (±130º)

Axis	Robot variant	Max. value
5	IRB 1200-7/0.7	J_5 = Mass x $((Z + 0.082)^2 + L^2)$ + max (J_{ox}, J_{oy}) ≤ 0.45 kgm^2
	IRB 1200-5/0.9 IRB 1200-7/0.9	J_5 = Mass x $((Z + 0.082)^2 + L^2)$ + max (J_{ox}, J_{oy}) ≤ 0.45 kgm^2
6	IRB 1200-7/0.7	J_6= Mass x L^2 + J_{0Z} ≤ 0.2 kgm^2
	IRB 1200-5/0.9 IRB 1200-7/0.9	J_6= Mass x L^2 + J_{0Z} ≤ 0.2 kgm^2



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Position	Description
A	Center of gravity
J_{ox}, J_{oy}, J_{oz}	Max. moment of inertia around the X, Y and Z axes at center of gravity.

Limited axis 5, center line down

Axis	Robot variant	Max. value
5	IRB 1200-7/0.7	J_5 = Mass x $((Z + 0.082)^2 + L^2)$ + max (J_{ox}, J_{oy}) ≤ 0.45 kgm^2
	IRB 1200-5/0.9 IRB 1200-7/0.9	J_5 = Mass x $((Z + 0.082)^2 + L^2)$ + max (J_{ox}, J_{oy}) ≤ 0.45 kgm^2
6	IRB 1200-7/0.7	J_6= Mass x L^2 + J_{0Z} ≤ 0.2 kgm^2
	IRB 1200-5/0.9 IRB 1200-7/0.9	J_6= Mass x L^2 + J_{0Z} ≤ 0.2 kgm^2

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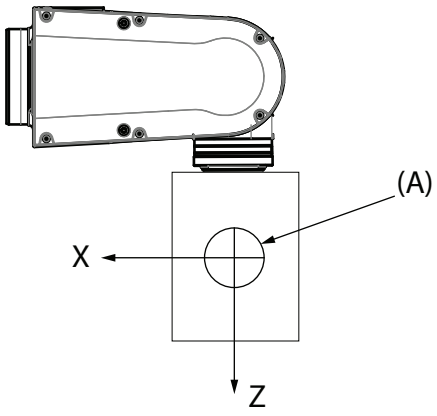

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Pos	Description
A	Center of gravity
J_{ox}, J_{oy}, J_{oz}	Max. moment of inertia around the X, Y and Z axes at center of gravity.

Wrist torque

The table below shows the maximum permissible torque due to payload.

Note

The values are for reference only, and should not be used for calculating permitted load offset (position of center of gravity) within the load diagram, since those also are limited by main axes torques as well as dynamic loads. Also arm loads will influence the permitted load diagram, contact your local ABB organization.

Robot variant	Max wrist torque axis 4 and 5	Max wrist torque axis 6	Max torque valid at load
IRB 1200-7/0.7	12.5 Nm	6.2 Nm	7 kg
IRB 1200-5/0.9	8.9 Nm	4.4 Nm	5 kg
IRB 1200-7/0.9	12.5 Nm	6.2 Nm	7 kg

Continues on next page

1.4.3.1 Maximum TCP acceleration

General

Higher values can be reached with lower loads than the nominal because of our dynamical motion control QuickMove2. For specific values in the unique customer cycle, or for robots not listed in the table below, we recommend to use RobotStudio.

Maximum Cartesian design acceleration for nominal loads

Robot type	E-stop Max acceleration at nominal load COG [m/s^2]	Controlled Motion Max acceleration at nominal load COG [m/s^2]
IRB 1200-7/0.7	88	68
IRB 1200-5/0.9	94	79
IRB 1200-7/0.9	74	50

Note

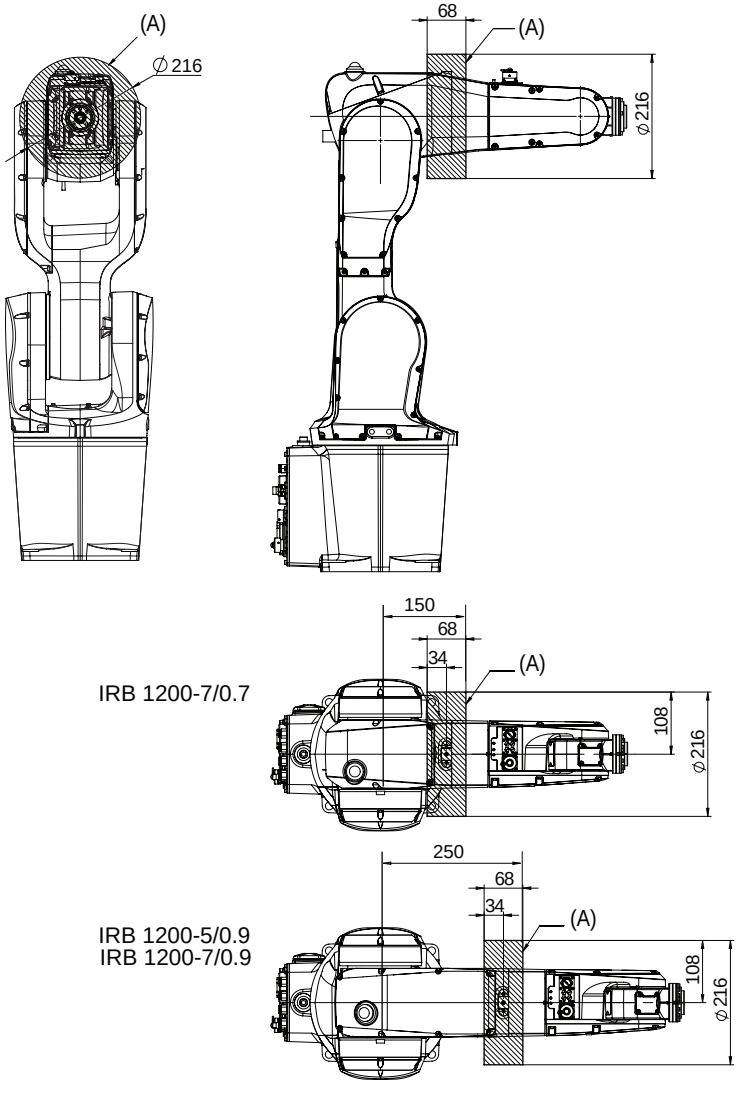
Acceleration levels for emergency stop and controlled motion includes acceleration due to gravitational forces. Nominal load is defined with nominal mass and cog with max offset in Z and L (see the load diagram).

1.5 Fitting of equipment

1.5.1 Introduction to fitting of equipment

General

Extra loads can be mounted on to the upper arm. Definitions of load area and permitted load are shown in figure below. The center of gravity of the extra load shall be within the marked load areas. The robot is supplied with holes for fitting of extra equipment. (See *Holes for fitting extra equipment on page 38*).



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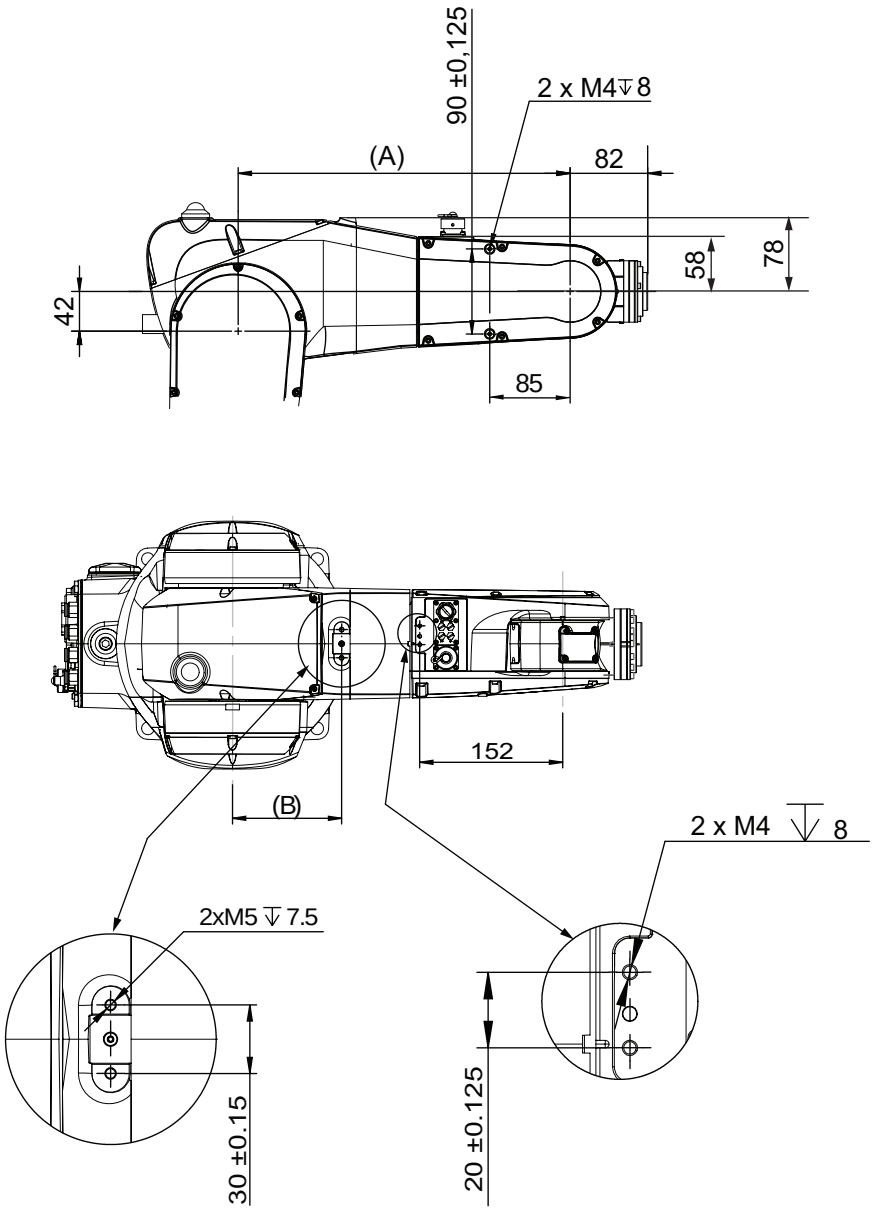
Load area (A)	Max load
IRB 1200-5/0.9	0.3 kg
IRB 1200-7/0.7	
IRB 1200-7/0.9	0.5 kg

1.5.2 Holes for fitting extra equipment

Upper arm



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Pos	Description
A	IRB 1200-5/0.9 = 451 mm, IRB 1200-7/0.7 = 351 mm, IRB 1200-7/0.9 = 451 mm
B	IRB 1200-5/0.9 = 216 mm, IRB 1200-7/0.7 = 116 mm, IRB 1200-7/0.9 = 216 mm

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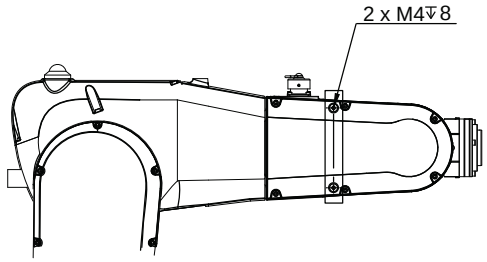
Note

The two M4 thread holes shown in the following figure are used for fitting the cable harness or air hoses of the tools rather than fitting extra equipment.



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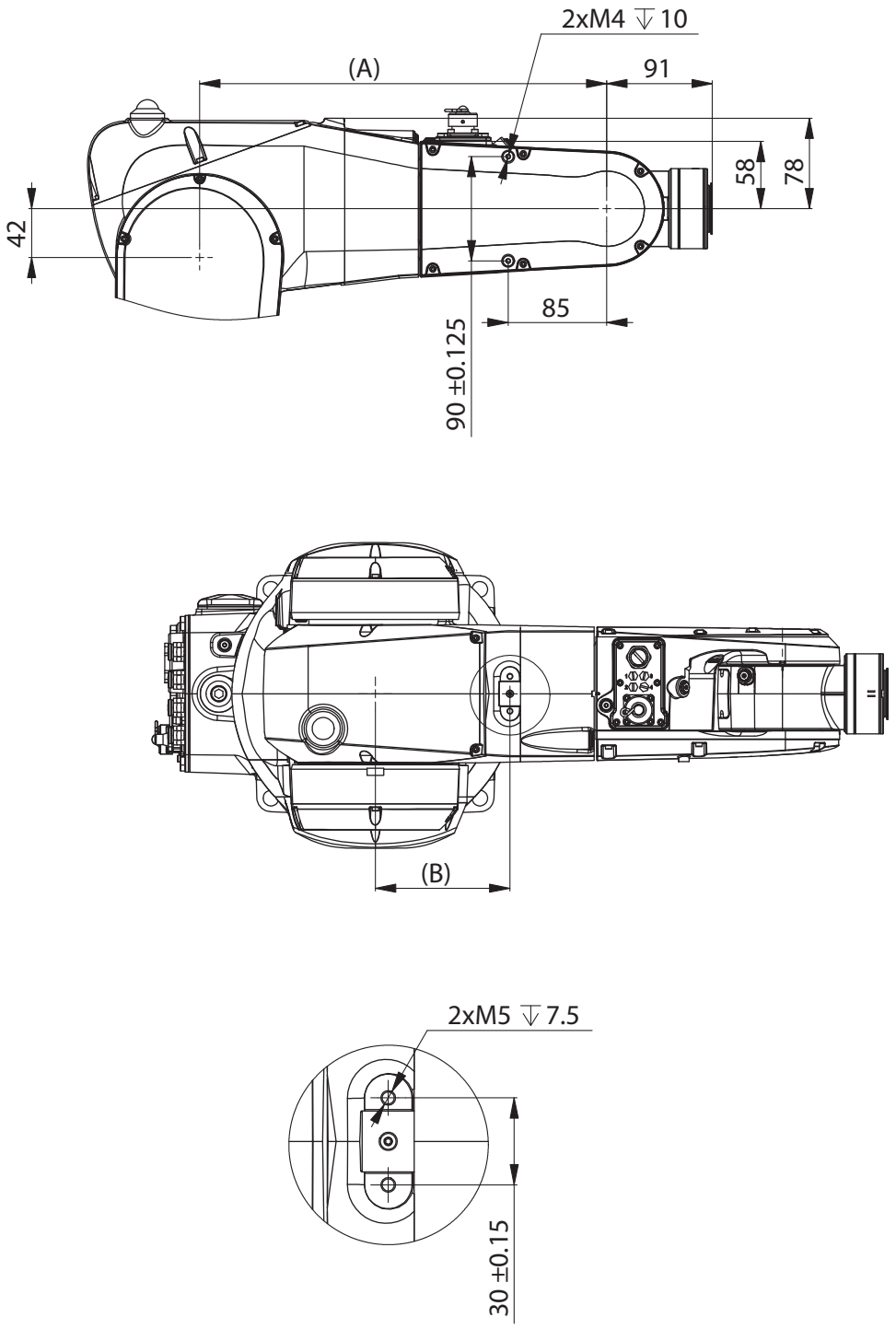
1.5.2 Holes for fitting extra equipment
Continued

Upper arm for Hygienic robots



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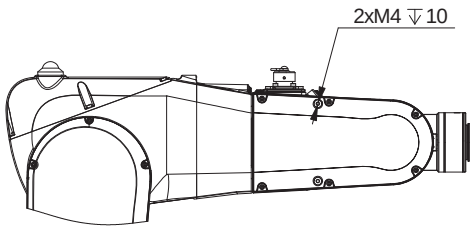
Pos	Description
A	IRB 1200-5/0.9 = 451 mm, IRB 1200-7/0.7 = 351 mm
B	IRB 1200-5/0.9 = 216 mm, IRB 1200-7/0.7 = 116 mm

Continues on next page

Note

The two M4 thread holes shown in the following figure are used for fitting the cable harness or air hoses of the tools rather than fitting extra equipment.



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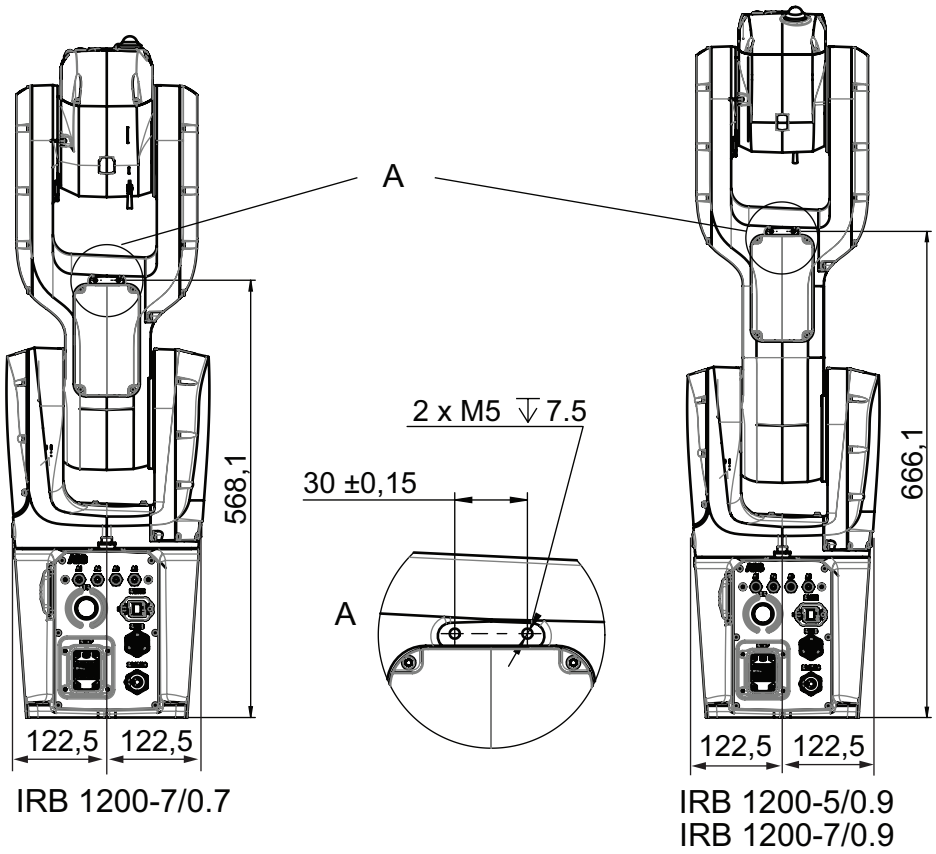
Lower arm



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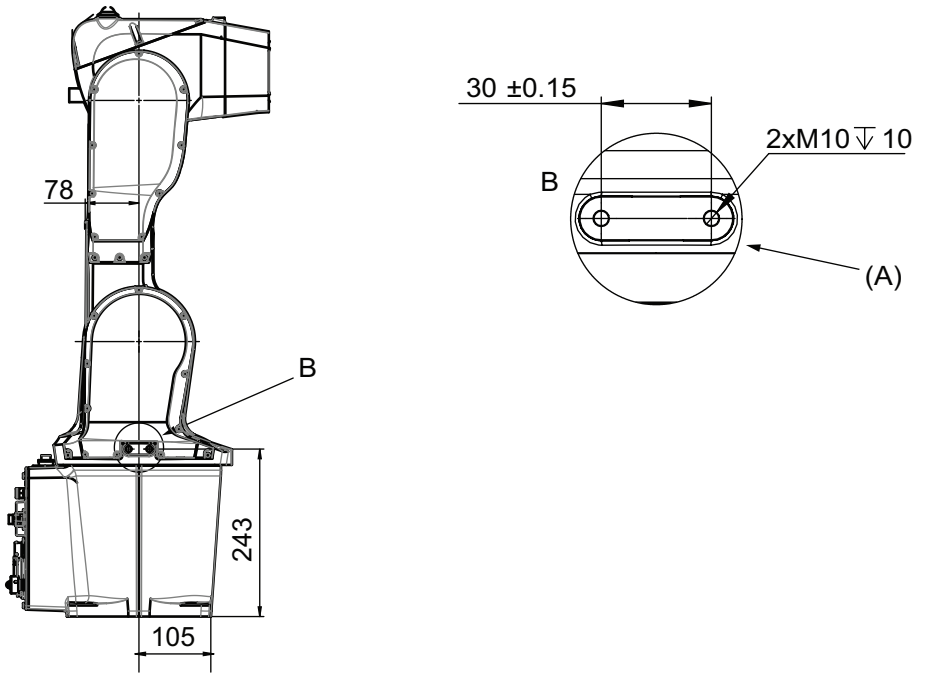
1.5.2 Holes for fitting extra equipment
Continued

Frame



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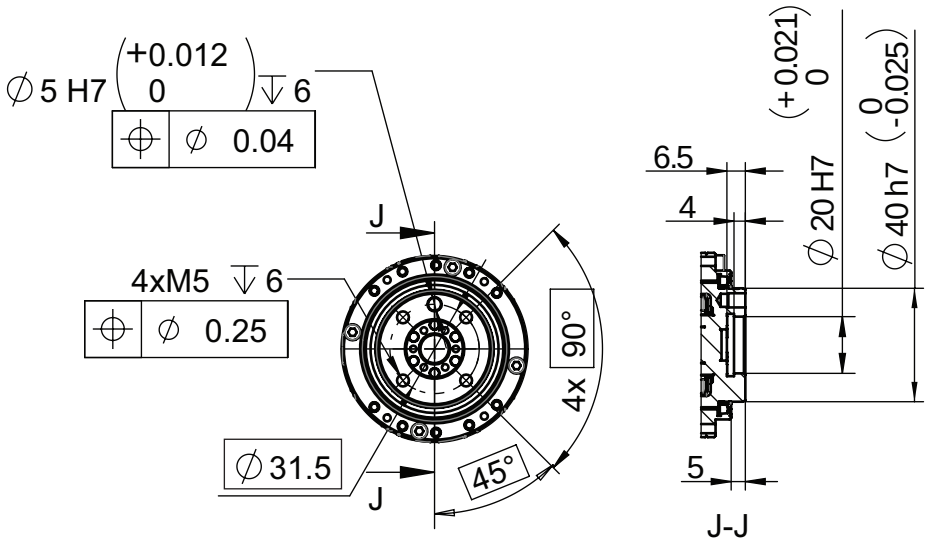
Pos	Description
A	Holes on both sides

Robot tool flange



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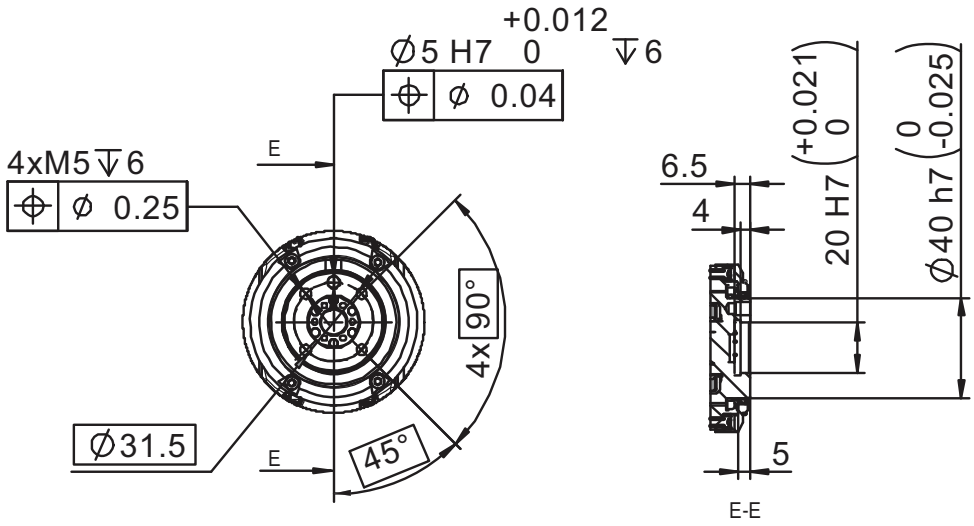
Robot tool flange for Foundry Plus robots



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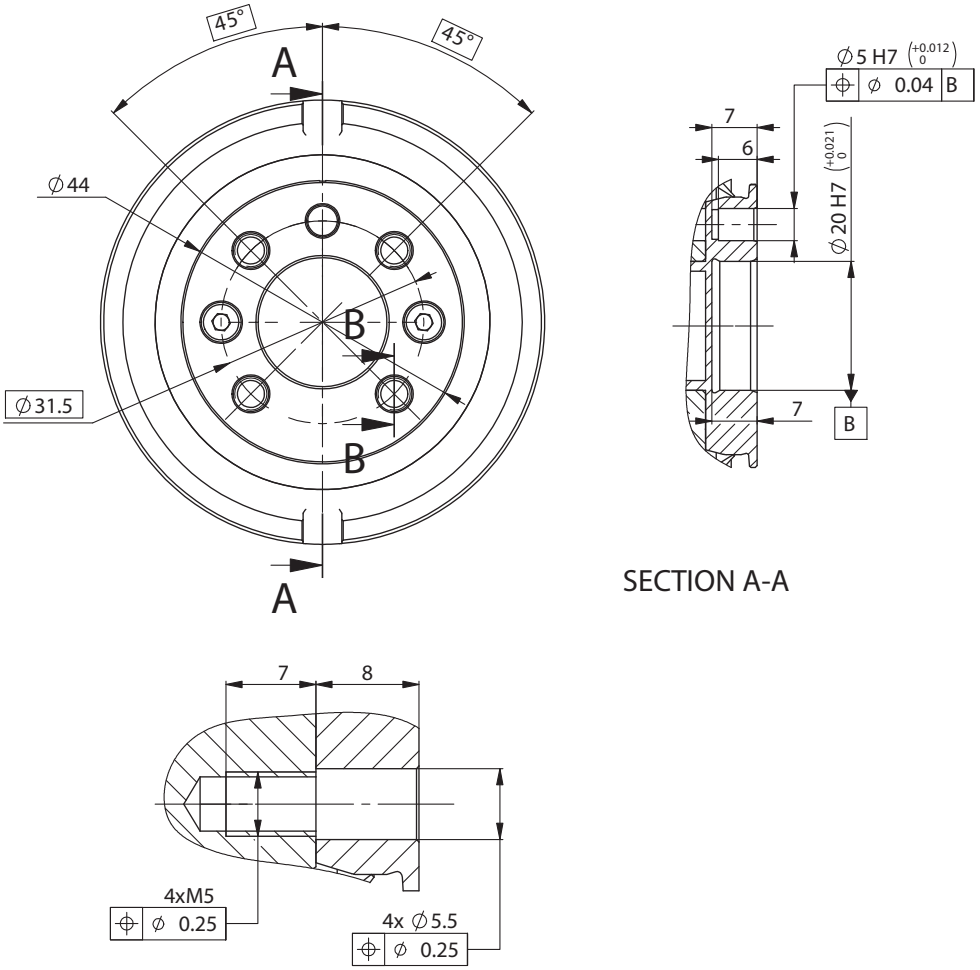
1.5.2 Holes for fitting extra equipment
Continued

Robot tool flange for Hygienic robots



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Fastener quality

When fitting tools on the tool flange, only use screws with quality 12.9. For other equipment use suitable screws and tightening torque for your application.

1.6 Calibration

1.6.1 Calibration methods

Overview

This section specifies the different types of calibration and the calibration methods that are supplied by ABB.

The original calibration data delivered with the robot is generated when the robot is floor mounted. If the robot is not floor mounted, then the robot accuracy could be affected. The robot needs to be calibrated after it is mounted.

More information is available in the product manual.

Types of calibration

Type of calibration	Description	Calibration method
Standard calibration	The calibrated robot is positioned at calibration position. Standard calibration data is found on the SMB (serial measurement board) or EIB in the robot.	Axis Calibration or manual calibration[i]
Absolute accuracy calibration (optional)	Based on standard calibration, and besides positioning the robot at synchronization position, the Absolute accuracy calibration also compensates for: • Mechanical tolerances in the robot structure • Deflection due to load Absolute accuracy calibration focuses on positioning accuracy in the Cartesian coordinate system for the robot. Absolute accuracy calibration data is found on the serial measurement board (SMB) or other robot memory. A robot calibrated with Absolute accuracy has the option information printed on its name plate (OmniCore). To regain 100% Absolute accuracy performance, the robot must be recalibrated for absolute accuracy after repair or maintenance that affects the mechanical structure.	CalibWare

Continues on next page

1.6.1 Calibration methods
Continued

Type of calibration	Description	Calibration method
Optimization	Optimization of TCP reorientation performance. The purpose is to improve reorientation accuracy for continuous processes like welding and gluing. Wrist optimization will update standard calibration data for axes 4 and 5. **Note** For advanced users, it is also possible to use the do the wrist optimization using the RAPID instruction `WristOpt`, see *Technical reference manual - RAPID Instructions, Functions and Data types*. This instruction is only available for OmniCore robots.	Wrist Optimization

i The robot is calibrated by either manual calibration or Axis Calibration at factory. Always use the same calibration method as used at the factory.
Information about valid calibration method is found on the calibration label or in the calibration menu on the FlexPendant.
If no data is found related to standard calibration, manual calibration is used as default.

Brief description of calibration methods

Axis Calibration method

Axis Calibration is a standard calibration method for calibration of IRB 1200. It is the recommended method in order to achieve proper performance.

The following routines are available for the Axis Calibration method:

- Fine calibration
- Update revolution counters
- Reference calibration

The calibration equipment for Axis Calibration is delivered as a toolkit.

The actual instructions of how to perform the calibration procedure and what to do at each step is given on the FlexPendant. You will be guided through the calibration procedure, step by step.

Wrist Optimization method

Wrist Optimization is a method for improving reorientation accuracy for continuous processes like welding and gluing and is a complement to the standard calibration method.

The actual instructions of how to perform the wrist optimization procedure is given on the FlexPendant.

CalibWare - Absolute Accuracy calibration

The CalibWare tool guides through the calibration process and calculates new compensation parameters. This is further detailed in the *Application manual - CalibWare Field*.

If a service operation is done to a robot with the option Absolute Accuracy, a new absolute accuracy calibration is required in order to establish full performance.

Continues on next page

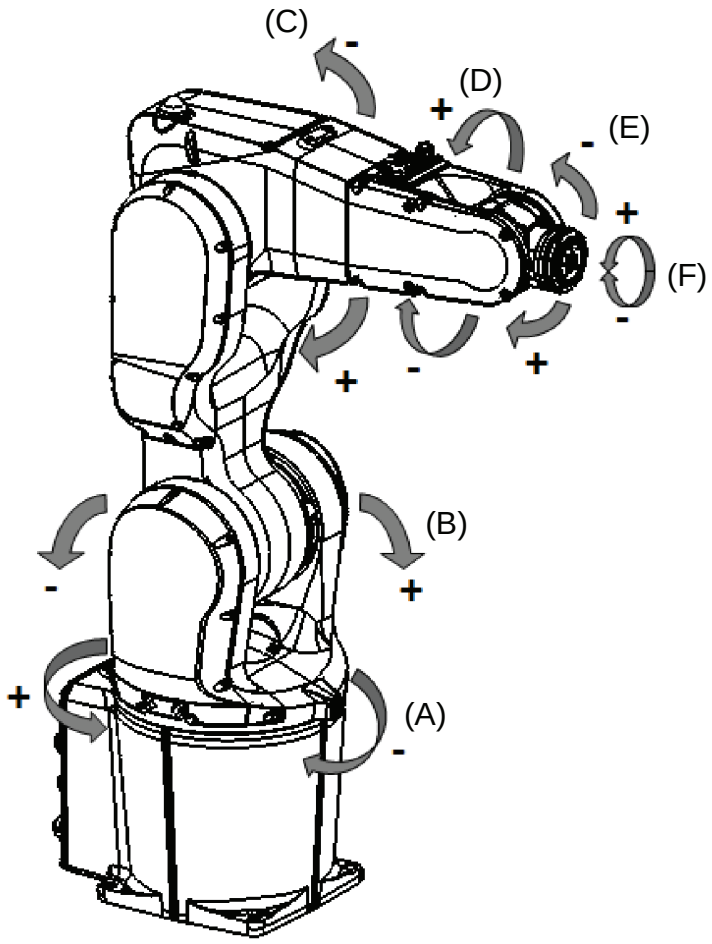
For most cases after replacements that do not include taking apart the robot structure, standard calibration is sufficient.

The Absolute Accuracy option varies according to the robot mounting position. This is printed on the robot name plate for each robot. The robot must be in the correct mounting position when it is recalibrated for absolute accuracy.

1.6.2 Fine calibration

General

Fine calibration is made by moving the axes to a fixed position on the frame. For detailed information on calibration of the robot see *Product manual - IRB 1200*.



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Position	Description	Position	Description
A	Axis 1	B	Axis 2
C	Axis 3	D	Axis 4
E	Axis 5	F	Axis 6

1.6.3 Absolute Accuracy calibration

Purpose

Absolute Accuracy is a calibration concept that improves TCP accuracy. The difference between an ideal robot and a real robot can be several millimeters, resulting from mechanical tolerances and deflection in the robot structure. *Absolute Accuracy* compensates for these differences.

Here are some examples of when this accuracy is important:

- Exchangeability of robots
- Offline programming with no or minimum touch-up
- Online programming with accurate movement and reorientation of tool
- Programming with accurate offset movement in relation to eg. vision system or offset programming
- Re-use of programs between applications

The option *Absolute Accuracy* is integrated in the controller algorithms and does not need external equipment or calculation.

Note

The performance data is applicable to the corresponding RobotWare version of the individual robot.

Note

Singularities might appear in slightly different positions on a real robot compared to RobotStudio, where *Absolute Accuracy* is off compared to the real controller.

What is included

Every *Absolute Accuracy* robot is delivered with:

- compensation parameters saved in the robot memory
- a birth certificate representing the *Absolute Accuracy* measurement protocol for the calibration and verification sequence.

A robot with *Absolute Accuracy* calibration has a label with this information on the manipulator.

Absolute Accuracy supports floor mounted, wall mounted, and ceiling mounted installations. The compensation parameters that are saved in the robot memory differ depending on which Absolute Accuracy option is selected.

When is *Absolute Accuracy* being used

Absolute Accuracy works on a robot target in Cartesian coordinates, not on the individual joints. Therefore, joint based movements (e.g. `MoveAbsJ`) will not be affected.

Continues on next page

1.6.3 Absolute Accuracy calibration
Continued

If the robot is inverted, the Absolute Accuracy calibration must be performed when the robot is inverted.

Absolute Accuracy active

Absolute Accuracy will be active in the following cases:

- Any motion function based on robtargets (e.g. `MoveL`) and ModPos on robtargets
- Reorientation jogging
- Linear jogging
- Tool definition (4, 5, 6 point tool definition, room fixed TCP, stationary tool)
- Work object definition

Absolute Accuracy not active

The following are examples of when Absolute Accuracy is not active:

- Any motion function based on a jointtarget (`MoveAbsJ`)
- Independent joint
- Joint based jogging

RAPID instructions

There are no RAPID instructions included in this option.

Production data

Typical production data regarding calibration are:

Robot	Positioning accuracy (mm)		
	Average	Max	% Within 1 mm
IRB 1200-7/0.7	0.13	0.30	100
IRB 1200-5/0.9	0.14	0.45	100

1.7 Maintenance and troubleshooting

1.7.1 Introduction to maintenance and trouble shooting

General

The robot requires only a minimum of maintenance during operation. It has been designed to make it as easy to service as possible:

- Maintenance-free AC motors are used.
- Grease used for all gearboxes.
- The cabling is routed for longevity, and in the unlikely event of a failure, its modular design makes it easy to change.

Maintenance

The maintenance intervals depend on the use of the robot, the required maintenance activities also depends on selected options. For detailed information on maintenance procedures, see *Maintenance* section in the *Product Manual - IRB 1200*.

1.8 Robot motion

1.8.1 Working range and type of motion

Robot motion

Location of motion	Type of motion	IRB 1200-7/0.7	IRB 1200-5/0.9	IRB 1200-7/0.9
Axis 1	Rotation motion	+170° to -170°	+170° to -170°	+170° to -170° [i]
Axis 2	Arm motion	+135° to -100°	+130° to -100°	+130° to -100°
Axis 3	Arm motion	+70° to -200°	+70° to -200°	+70° to -200°
Axis 4	Wrist motion	+270° to -270°	+270° to -270°	+270° to -270°
Axis 5	Bend motion	±130° (not Hygienic robots) ±128° (Hygienic robots)	±130°	±130°
Axis 6	Turn motion	Default: +400° to -400° Maximum revolution: ±242 [ii]	Default: +400° to -400° Maximum revolution: ±242 *ii*	Default: +400° to -400° Maximum revolution: ±242 *ii*

i Wall mounted robot has a work area for axis 1 that depends on payload and the positions of other axes. Simulation in RobotStudio is recommended.

ii The default working range for axis 6 can be extended by changing parameter values in the software. Option Independent axis can be used for resetting the revolution counter after the axis has been rotated (no need for "rewinding" the axis).

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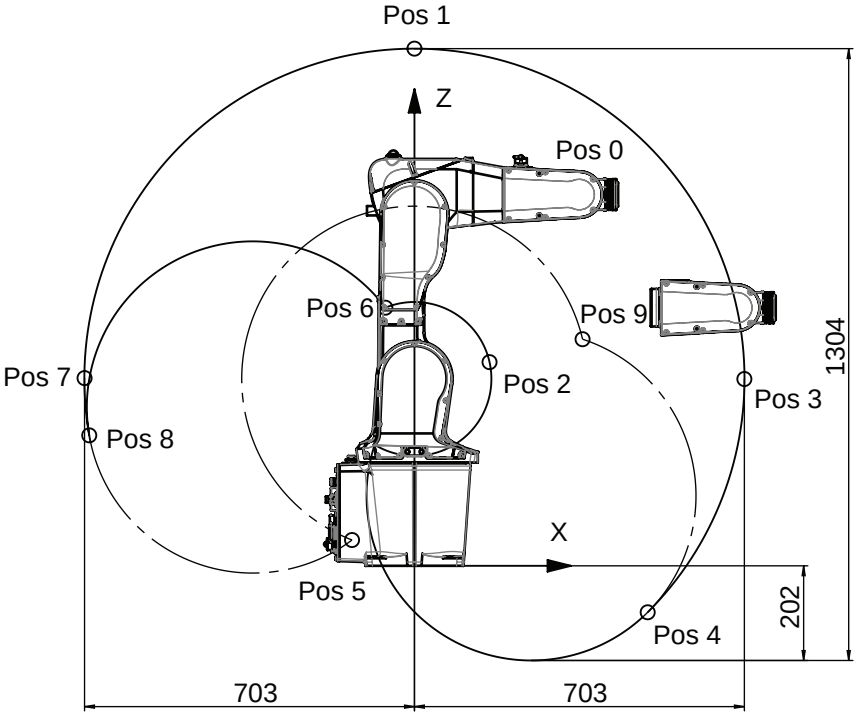
Working range

IRB 1200-7/0.7 Working range, positions at wrist center and angle of axes 2 and 3

The illustration shows the unrestricted working range of the robot.



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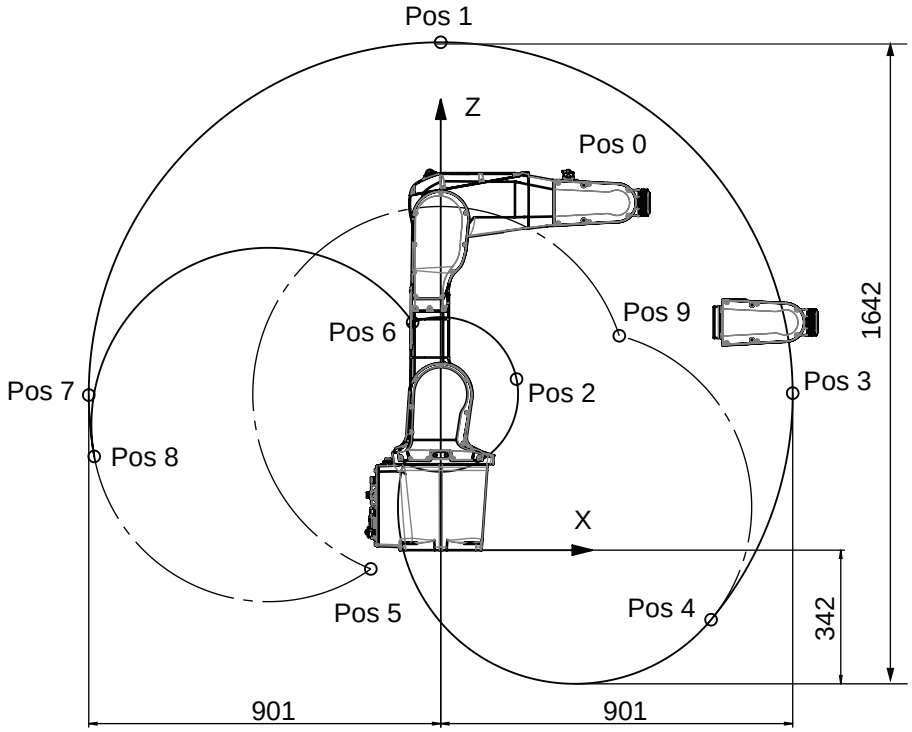
Position in the figure	Positions at wrist center (mm)		Angle (degrees)	
	X	Z	Axis 2	Axis 3
Pos0	351	791	0º	0º
Pos1	0	1102	0º	-83º
Pos2	160	434	0º	+70º
Pos3	703	398	+90º	-83º
Pos4	497	-99	+135º	-83º
Pos5	-133	55	-100º	-200º
Pos6	-62	550	-100º	+70º
Pos7	-703	400	-90º	-83º
Pos8	-693	278	-100º	-83º
Pos9	358	488	+135°	-200°

Continues on next page

1.8.1 Working range and type of motion
Continued

IRB 1200-5/0.9 Working range, positions at wrist center and angle of axes 2 and 3

The illustration shows the unrestricted working range of the robot.



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Position in the figure	Positions at wrist center (mm)		Angle (degrees)	
	X	Z	Axis 2	Axis 3
Pos0	451	889	0º	0º
Pos1	0	1300	0º	-85º
Pos2	194	438	0º	+70º
Pos3	901	402	+90º	-85º
Pos4	692	-178	+130º	-85º
Pos5	-179	-48	-100º	-200º
Pos6	-72	583	-100º	+70º
Pos7	-901	397	-90º	-85º
Pos8	-887	240	-100º	-85º
Pos9	458	549	+130°	-200°

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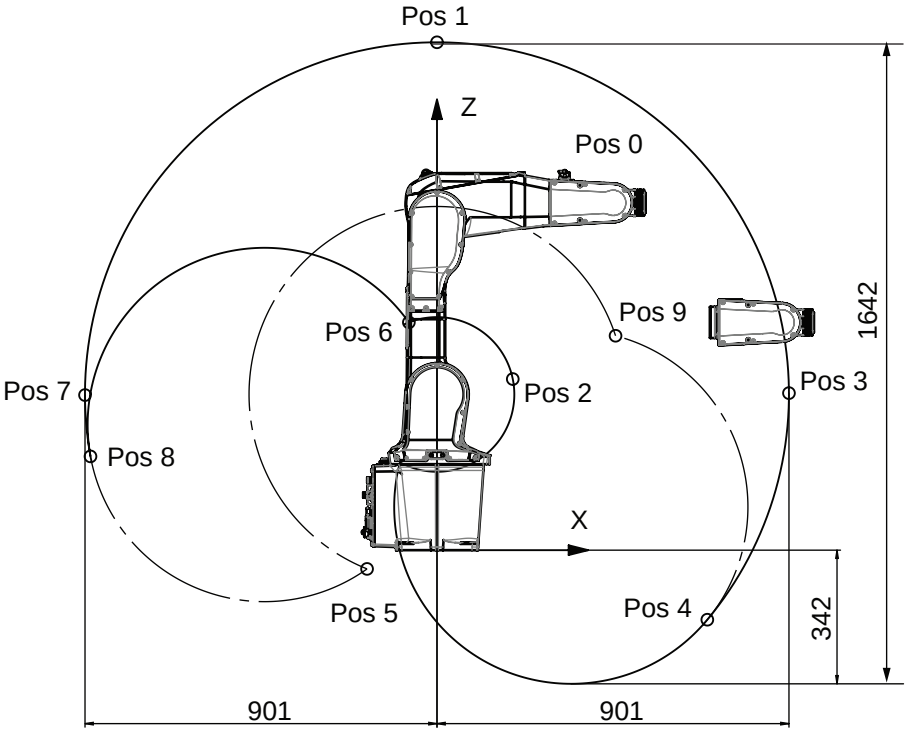
IRB 1200-7/0.9 Working range, positions at wrist center and angle of axes 2 and 3

The illustration shows the unrestricted working range of the robot.



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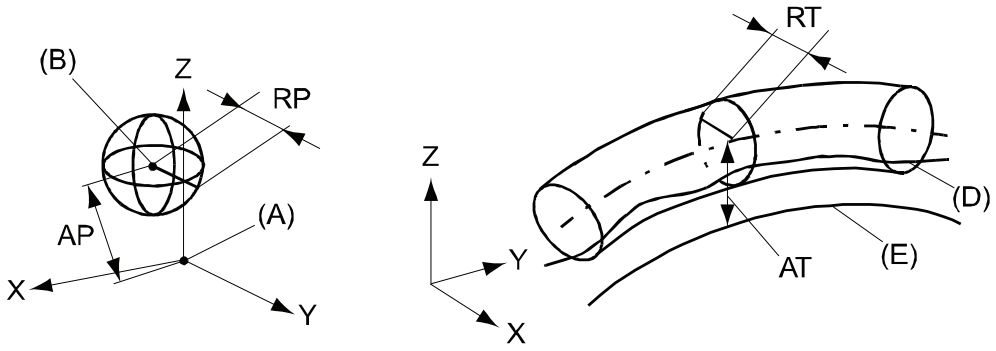
Position in the figure	Positions at wrist center (mm)		Angle (degrees)	
	X	Z	Axis 2	Axis 3
Pos0	451	889	0º	0º
Pos1	0	1300	0º	-85º
Pos2	194	438	0º	+70º
Pos3	901	402	+90º	-85º
Pos4	692	-178	+130º	-85º
Pos5	-179	-48	-100º	-200º
Pos6	-72	583	-100º	+70º
Pos7	-901	397	-90º	-85º
Pos8	-887	240	-100º	-85º
Pos9	458	549	+130°	-200°

1.8.2 Performance according to ISO 9283

General

At rated maximum load, maximum offset and 1.6 m/s velocity on the inclined ISO test plane, with all six axes in motion. Values in the table below are the average result of measurements on a small number of robots. The result may differ depending on where in the working range the robot is positioning, velocity, arm configuration, from which direction the position is approached, the load direction of the arm system. Backlashes in gearboxes also affect the result.

The figures for AP, RP, AT and RT are measured according to figure below.



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Position	Description	Position	Description
A	Programmed position	E	Programmed path
B	Mean position at program execution	D	Actual path at program execution
AP	Mean distance from programmed position	AT	Max deviation from E to average path
RP	Tolerance of position B at repeated positioning	RT	Tolerance of the path at repeated program execution

Description	Values		
	IRB 1200-5/0.9	IRB 1200-7/0.7	IRB 1200-7/0.9
Pose repeatability, RP (mm)	0.025	0.02	0.013
Pose accuracy, AP (mm)	0.02	0.02	0.005
Linear path repeatability, RT (mm)	0.07	0.02	0.049
Linear path accuracy, AT (mm)	0.53	0.77	0.880
Pose stabilization time, Pst (s) within 0.1 mm of the position	0.113	0.057	0.465

1.8.3 Velocity

3-phase power supply

Axis number	IRB 1200-5/0.9	IRB 1200-7/0.7	With Hygienic option	IRB 1200-7/0.9
1	288°/s	288°/s	280°/s	288°/s
2	240°/s	240°/s	230°/s	240°/s
3	297°/s	297°/s	290°/s	297°/s
4	400°/s	400°/s	380°/s	400°/s
5	405°/s	405°/s	380°/s	405°/s
6	600°/s	600°/s	600°/s	600°/s

1-phase power supply

When the robot uses a single phase power supply, like with OmniCore controller, the performance regarding max axis speed is reduced, see table below. The reduced top speed can be increased if the power supply minimum voltage is higher than the default setting 187 V (220x0.85). See the system parameter *Mains tolerance min*, *Technical reference manual - System parameters*.

Note that the robot acceleration is not affected by the single phase power supply. The cycle time may not be affected at all. RobotStudio can be used to test the cycle. The parameter *Mains tolerance min* can also be modified in RobotStudio.

Axis number	IRB 1200-5/0.9	IRB 1200-7/0.7	With Hygienic option	IRB 1200-7/0.9
1	288°/s	288°/s	280°/s	288°/s
2	240°/s	240°/s	230°/s	240°/s
3	297°/s	297°/s	290°/s	297°/s
4	376°/s	378°/s	380°/s	376°/s
5	399°/s	405°/s	380°/s	399°/s
6	600°/s	600°/s	600°/s	600°/s

1.9 Robot stopping distances and times

1.9.1 Robot stopping distances according to ISO 10218-1

About the data for robot stopping distances and times

All measurements and calculations of stopping distances and times are done according to ISO 10218-1, with single axis motion on axes 1, 2, and 3. If more than one axis is used for the movement, then the stopping distance and time can be longer. Normal delays of the hardware and software are taken into account. See more about the delays and their impact on the results, *Reading the data on page 60*.

The stopping distances and times are presented using the tool data and extension zones presented for the respected robot variant. These variables are 100%, 66%, and 33% of the maximum values for the robot.

The stop categories 0 and 1 are according to IEC 60204-1.

Note

The category 0 stop is not necessarily the worst case (depending on load, speed, application, wear, etc.).

Note

The stop category 1 is a controlled stop and will therefore have less deviation from the programmed path compared with a stop category 0.

Loads

The tool data that is used is presented for the respective robot variant.

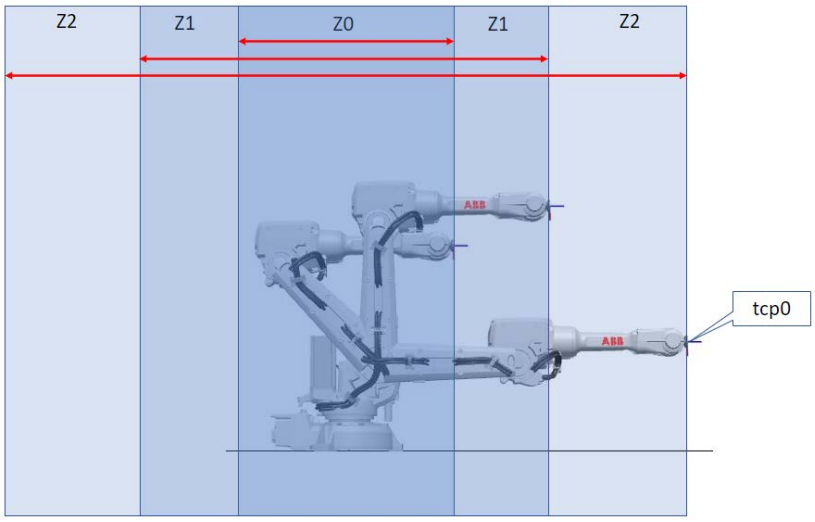
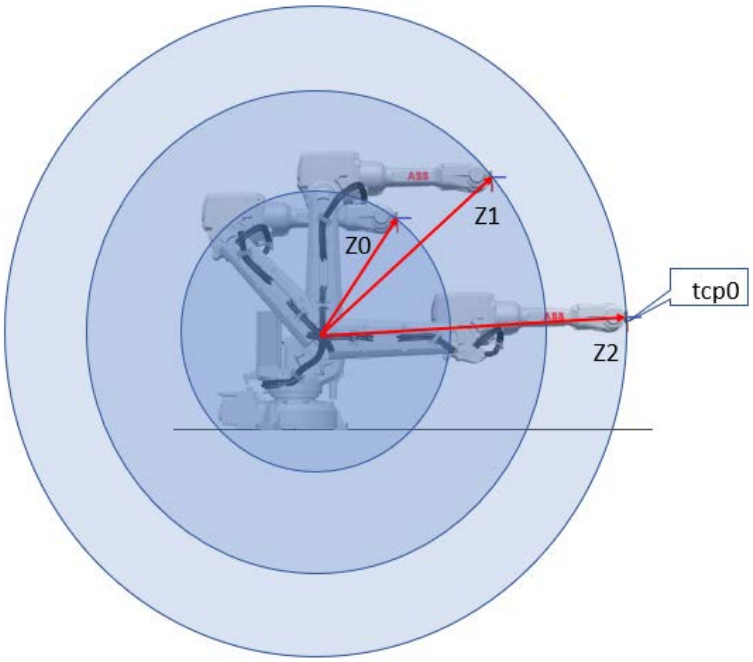
The used loads represent the rated load. No arm load is used. See the *Load diagram on page 27*.

Continues on next page

Extension zones

The extension zone for the stop category 1 is based on the tool mounting interface (tool flange) with the axis angles according to the following illustrations. The zone data is presented for the respective robot variant.

The extension zone outer limits are defined by the TCP0 position for the stated angles.

	Illustration
Axis 1	 xx2300000860
Axis 2	 xx2300000861

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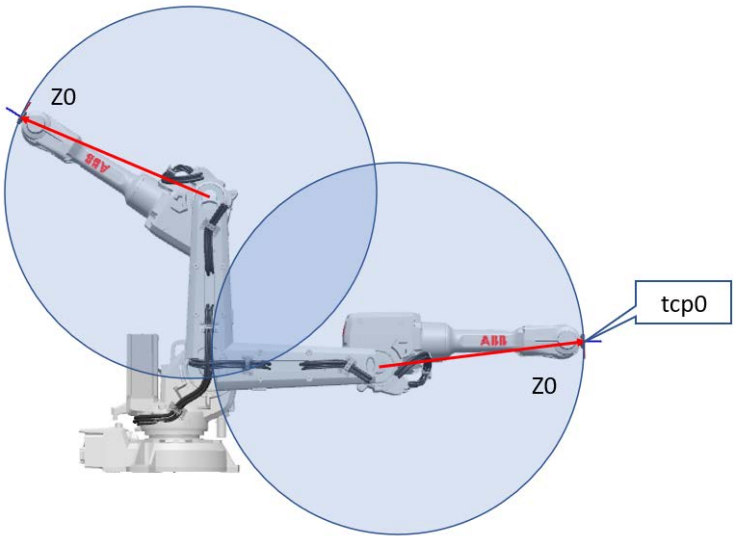
1.9.1 Robot stopping distances according to ISO 10218-1
Continued

	Illustration
Axis 3	

Speed

The speed in the simulations is based on TCP0.

The TCP0 speed is measured in meters per second when the stop is triggered.

Stopping distances

The stopping distance is measured in degrees.

Stopping times

The stopping time is measured in seconds.

Limitations

The stopping distance can vary depending on additional loads on the robot.

The stopping distance for category 0 stops can vary depending on the individual brakes and the joint friction.

Reading the data

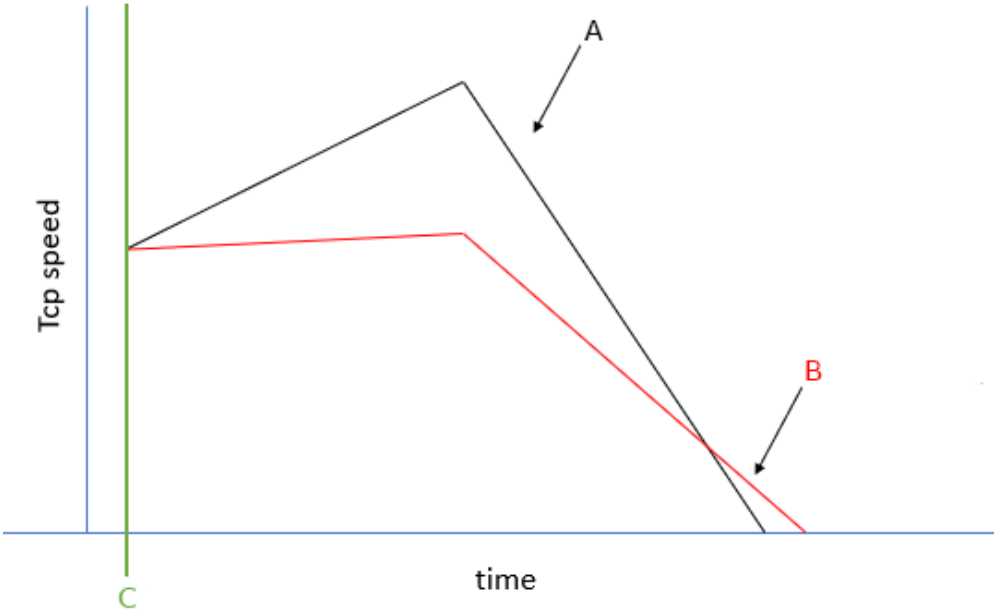
The data for stop category 0 is presented in tables, with distance and time for each axis.

The data for stop category 1 is presented as graphs with curves representing the different loads.

There is a short delay in the stop, which means that if the axis is accelerating when the stop is initiated (C), it will continue to accelerate during this delay time. This

Continues on next page

can result in graphs where a higher load (A) gives shorter stopping distance than a smaller load (B).



xx2300001041

The tcp speed is the actual speed when the stop is initiated, which is not necessarily the programmed speed.

1.9.2 Measuring stopping distance and time

Preparations before measuring

For measurement and calculation of overall system stopping performance, see ISO 13855:2010.

The measurement shall be done for the selected stop category. The emergency stop button on the robot controller is configured for stop category 0 on delivery. A risk assessment can conclude the need for another stop category. The stop category can be changed through the system parameter *Function* (topic *Controller*, type *Safety Run Chain*). In case of deviations of the default configuration of stop category 0, then this is detailed in the product specification for the respective manipulator.

CAUTION

The measurement and calculation of overall stopping performance for a robot must be tested with its correct load, speed, and tools, in its actual environment, before the robot is taken into production.

All load and tool data must be correctly defined (weight, CoG, moment of inertia). The load identification service routine can be used to identify the data.

CAUTION

Follow the safety instructions in the respective product manual for the robot.

Measuring with TuneMaster

The software TuneMaster can be used to measure stopping distances and times for ABB robots. The TuneMaster software contains documentation on how to use it.

1. Download TuneMaster from *www.abb.com/robotics*, section **RobotStudio - Downloads - RobotWare Tools and Utilities**.
2. Install TuneMaster on a computer. Start the TuneMaster app and select **Log Signals**.
3. Connect to the robot controller.
4. Define the I/O stop signal to use for measurement, for example, ES1 for emergency stop.
5. Define the signal number to use for measurement, 1298 for axis position. The value is given in radians.
6. Start the logging in TuneMaster.
7. Start the test program on the controller.

Tip

Use the tool and zone definitions for the respective variant in this document to get results that are comparable with this document.

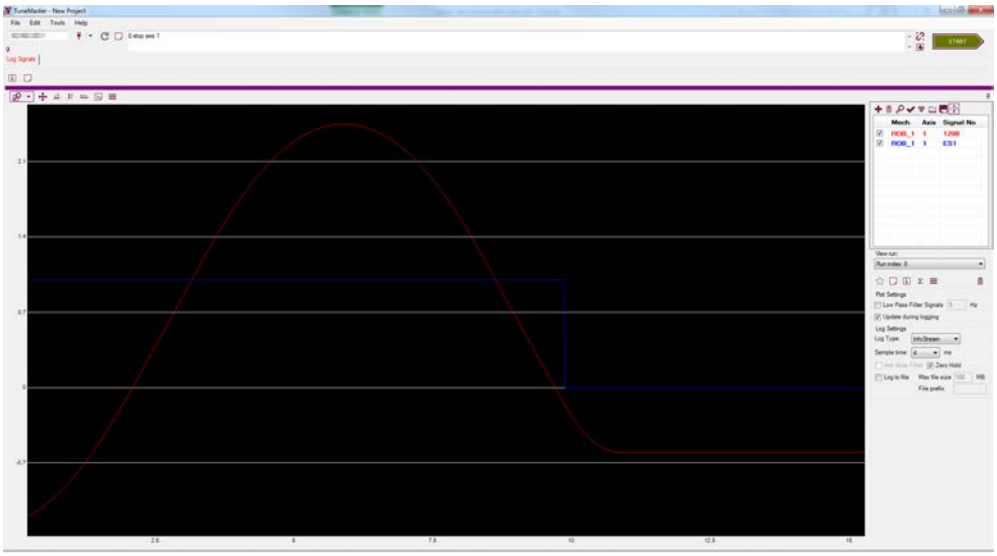
Continues on next page

8 When the axis has reached maximum speed, press the emergency stop button.

9 In TuneMaster, measure the stopping distance and time.

10 Repeat for all installed emergency stop buttons until the identified hazards due to stopping distance and time for axes have been verified.

Example from TuneMaster



xx1600000386

1.9.3 IRB 1200-5/0.9 Type B

Used tooldata

```
PERS tooldata P100:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [5, [0, 0,
     100], [1, 0, 0, 0], 0.0083, 0.0083, 0.0083]];
PERS tooldata P66:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [3.3, [0,
     0, 67], [1, 0, 0, 0], 0.0037, 0.0037, 0.0037]];
PERS tooldata P33:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [1.7, [0,
     0, 33], [1, 0, 0, 0], 0.00093, 0.00093, 0.00093]];
```

Category 0

The following table describes the stopping distance and time for category 0 stop.

Axis	Distance	Stop time
1	43.7°	0.23 s
2	38.5°	0.25 s
3	47.5°	0.24 s

Category 1, extension zones

For definitions of the zones, see *Extension zones on page 59*.

The zone border is the mounting interface location for axis 2 and axis 3.

Axis 1

Zone border	Axis 2	Axis 3
z0-z1	-42°	42°
z1-z2	6°	-6°

Axis 2

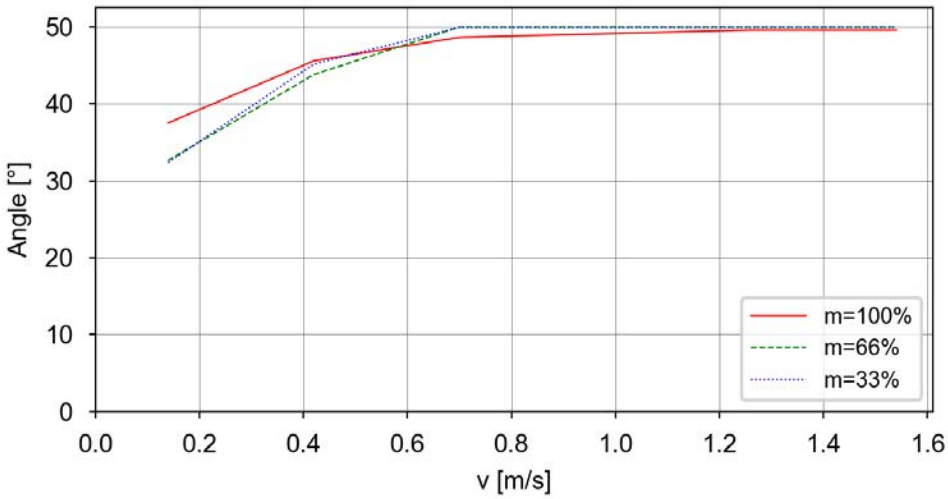
Zone border	Axis 2	Axis 3
z0-z1	48°	30°
z1-z2	90°	-30°

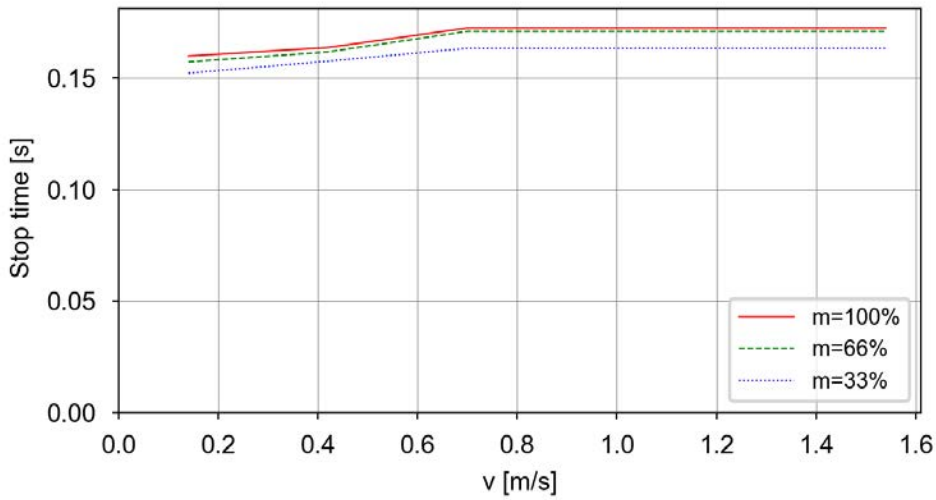
Axis 3

Only one zone exists.

Continues on next page

Category 1, Axis 1, Extension zone 0, stopping distance and stopping time





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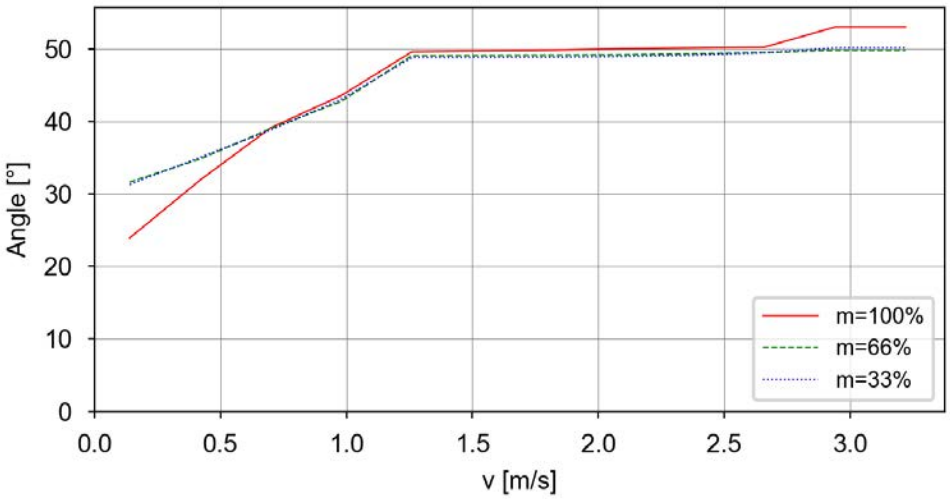
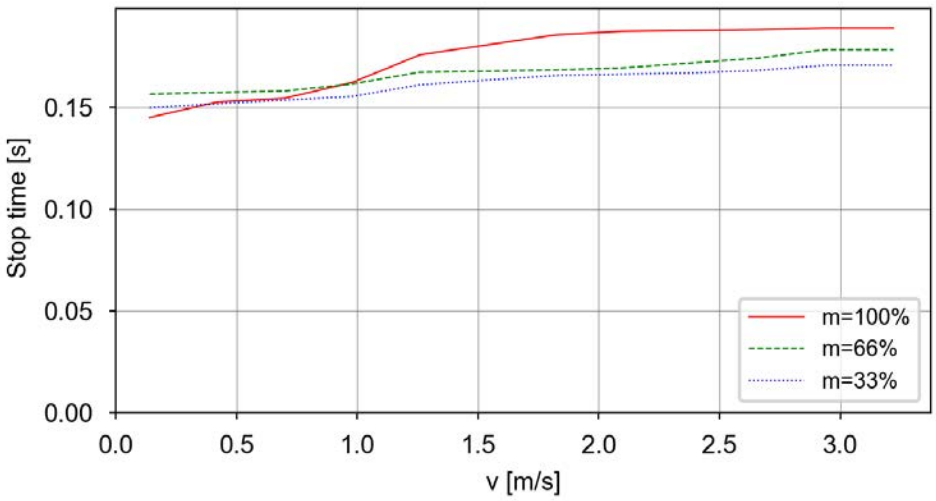
1.9.3 IRB 1200-5/0.9 Type B
Continued

Category 1, Axis 1, Extension zone 1, stopping distance and stopping time





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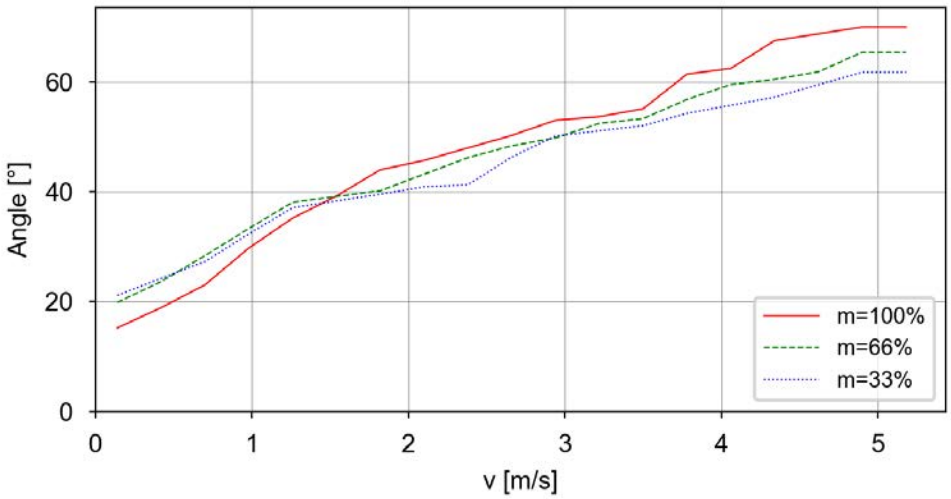
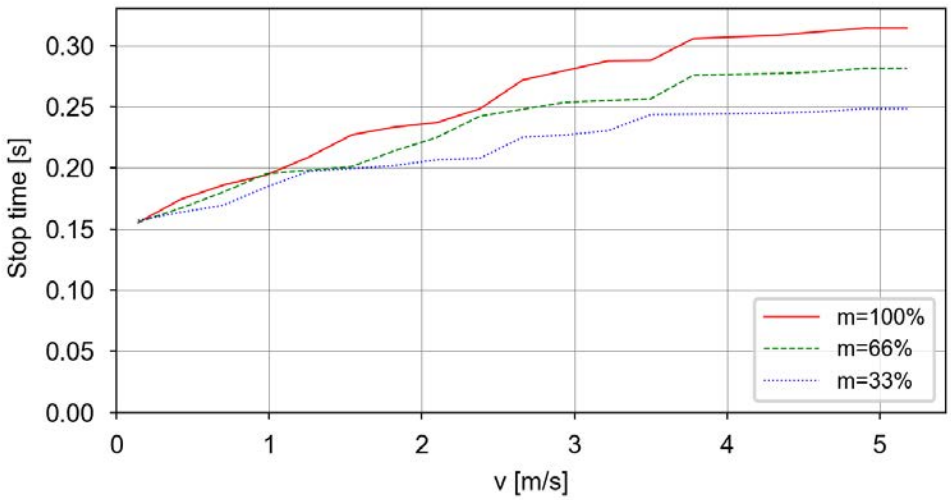
Category 1, Axis 1, Extension zone 2, stopping distance and stopping time





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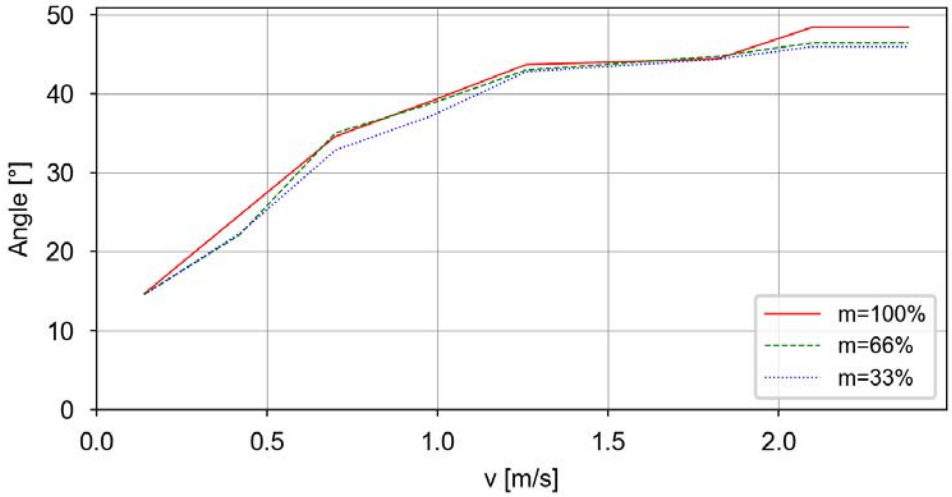
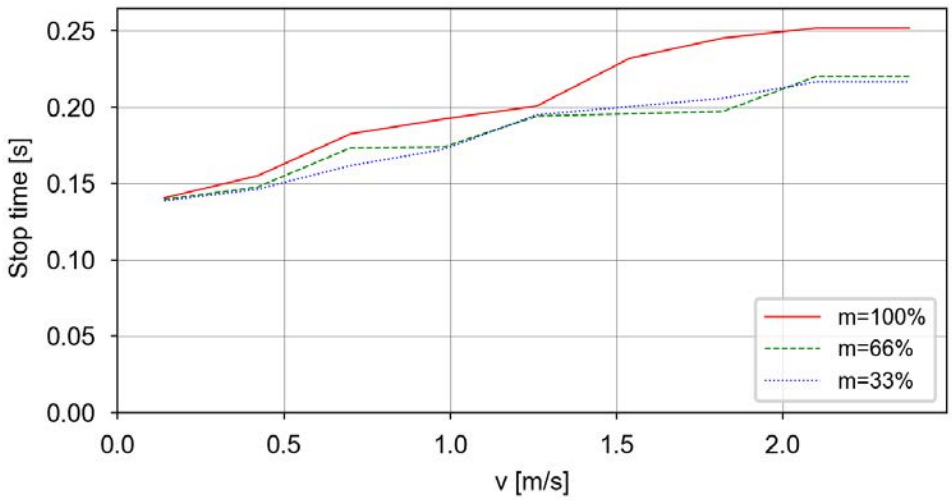
1.9.3 IRB 1200-5/0.9 Type B
Continued

Category 1, Axis 2, Extension zone 0, stopping distance and stopping time





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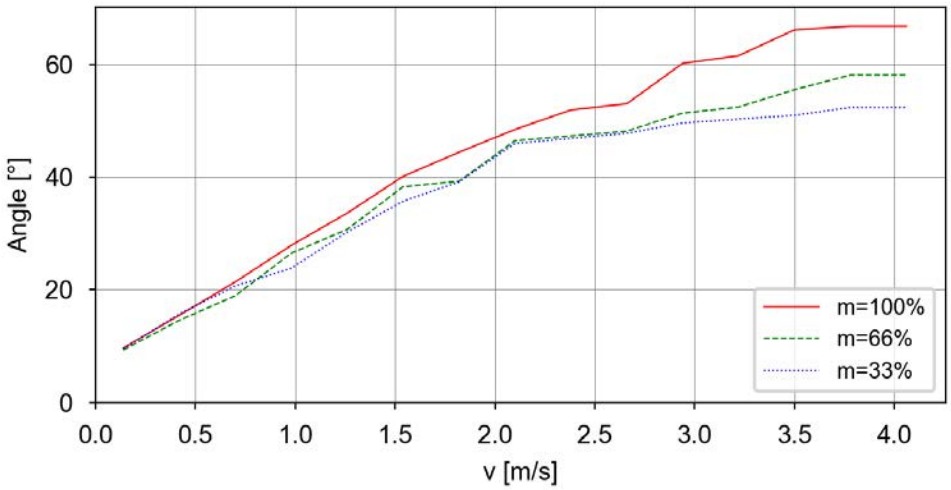
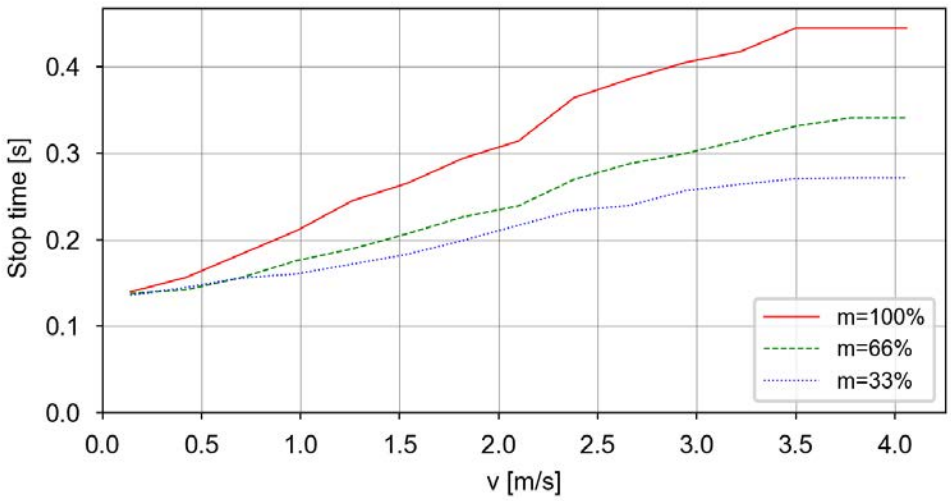
Category 1, Axis 2, Extension zone 1, stopping distance and stopping time





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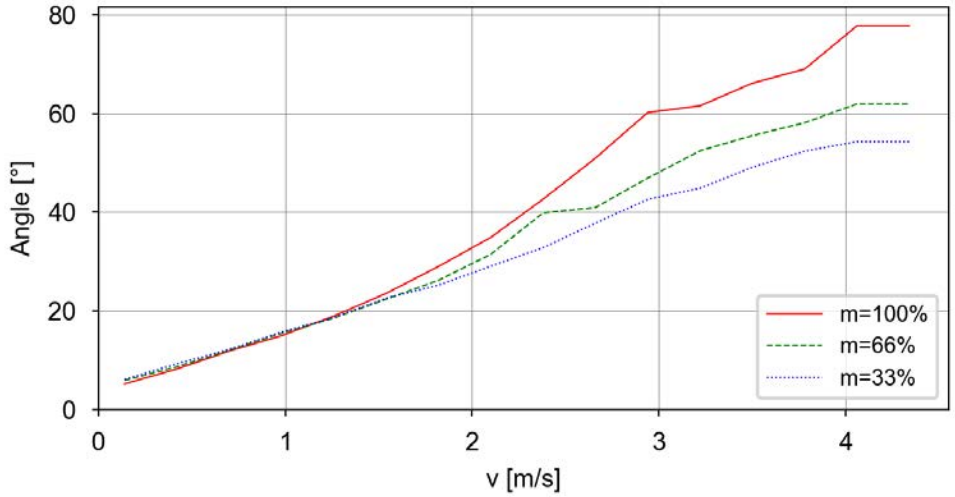
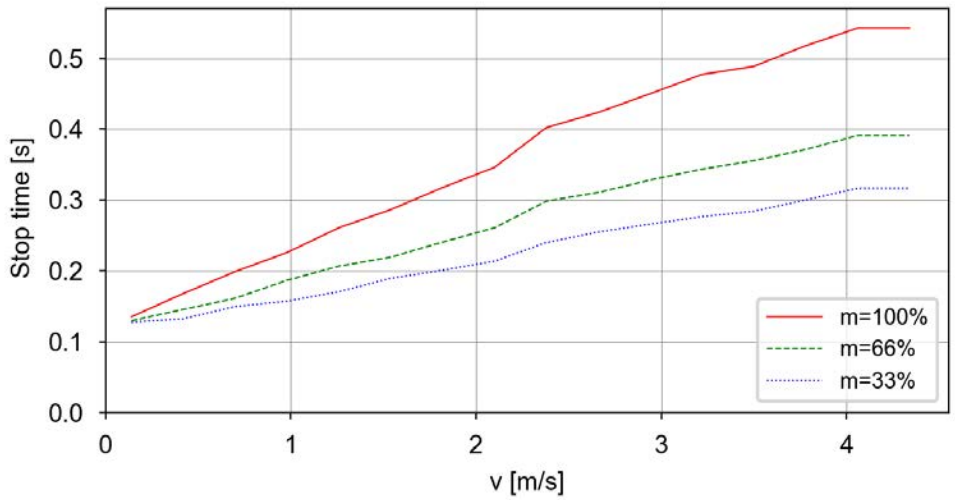
1.9.3 IRB 1200-5/0.9 Type B
Continued

Category 1, Axis 2, Extension zone 2, stopping distance and stopping time





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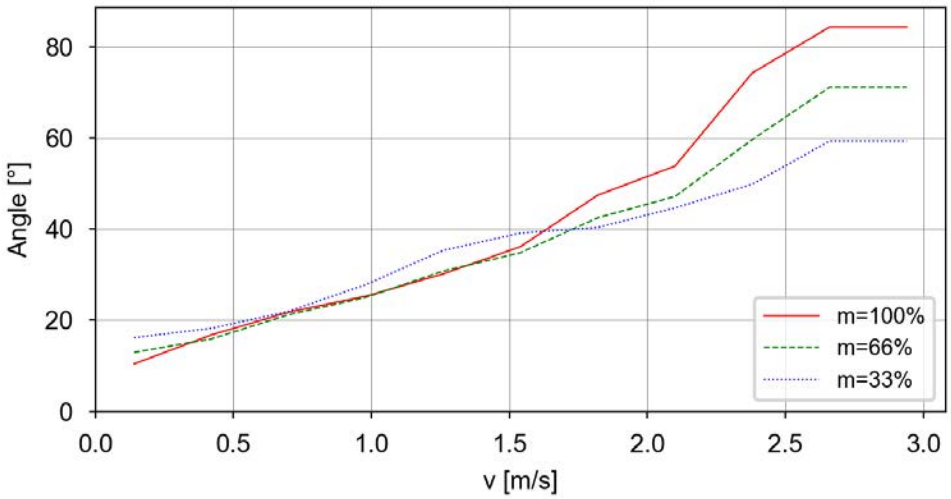
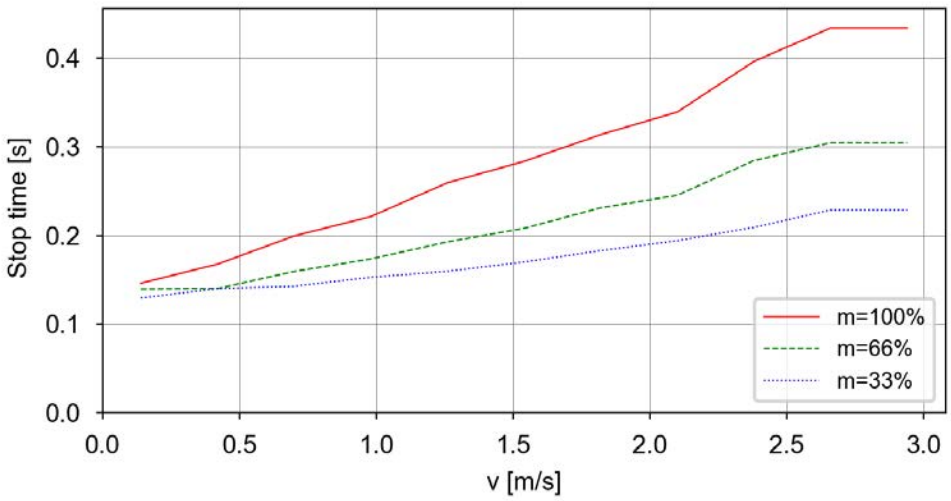
Category 1, Axis 3, Extension zone 0, stopping distance and stopping time





1.9.4 IRB 1200-7/0.7 Type B

Used tooldata

```
PERS tooldata P100:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [7, [0, 0,
     100], [1, 0, 0, 0], 0.012, 0.012, 0.012]];
PERS tooldata P66:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [4.7, [0,
     0, 67], [1, 0, 0, 0], 0.0052, 0.0052, 0.0052]];
PERS tooldata P33:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [2.3, [0,
     0, 33], [1, 0, 0, 0], 0.0013, 0.0013, 0.0013]];
```

Category 0

The following table describes the stopping distance and time for category 0 stop.

Axis	Distance	Stop time
1	36.8°	0.18 s
2	33.3°	0.21 s
3	41.9°	0.21 s

Category 1, extension zones

For definitions of the zones, see *Extension zones on page 59*.

The zone border is the mounting interface location for axis 2 and axis 3.

Axis 1

Zone border	Axis 2	Axis 3
z0-z1	-42°	42°
z1-z2	6°	-6°

Axis 2

Zone border	Axis 2	Axis 3
z0-z1	48°	30°
z1-z2	90°	-30°

Axis 3

Only one zone exists.

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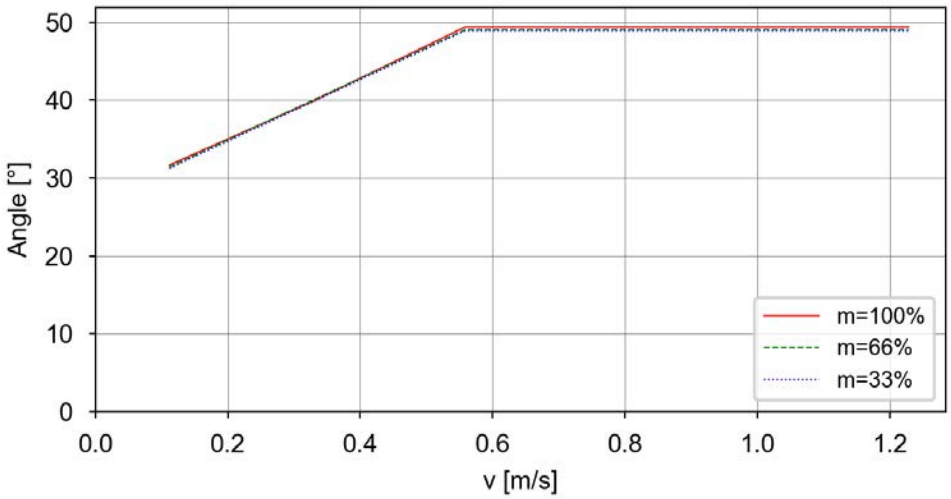
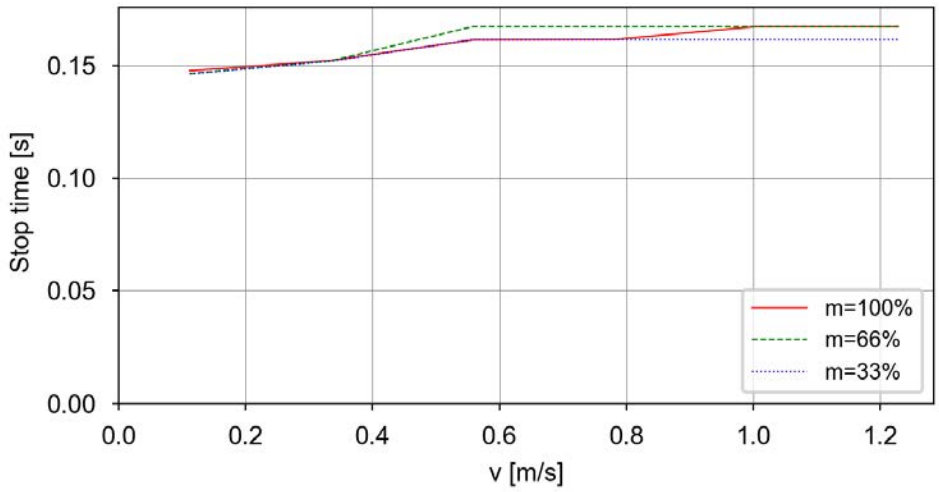
Category 1, Axis 1, Extension zone 0, stopping distance and stopping time





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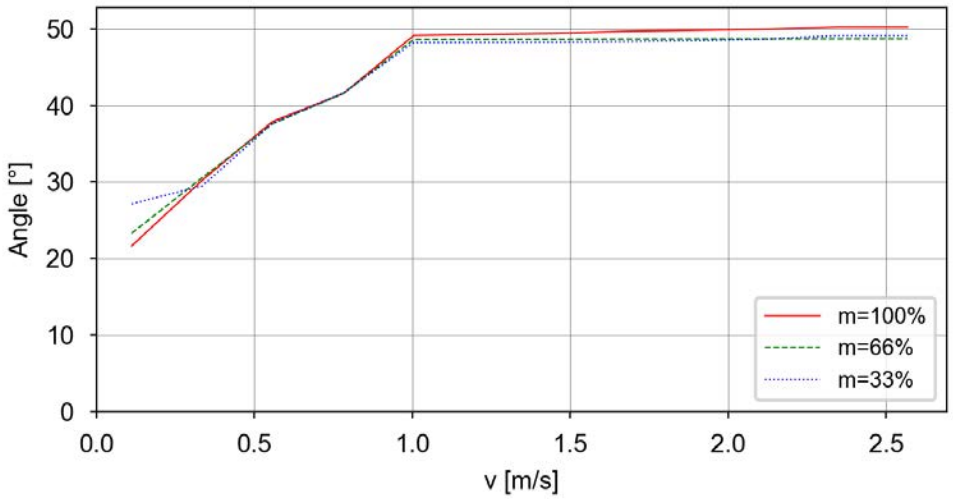
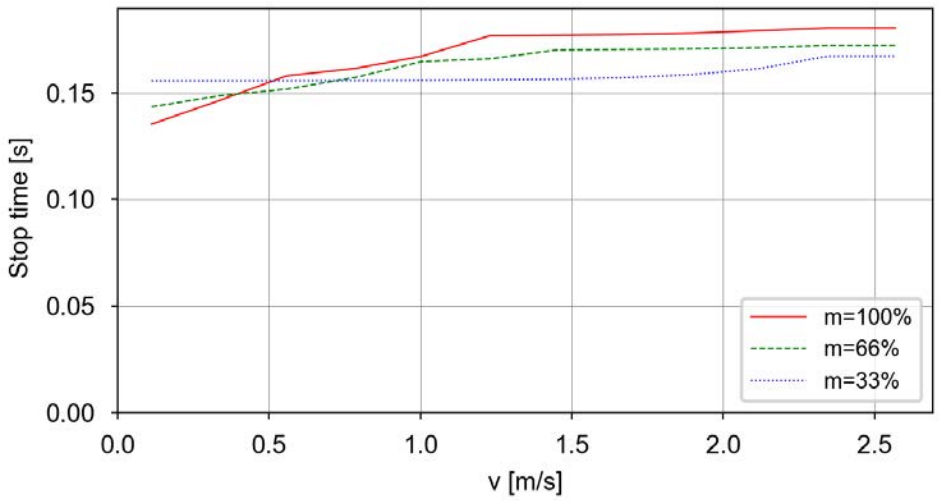
1.9.4 IRB 1200-7/0.7 Type B
Continued

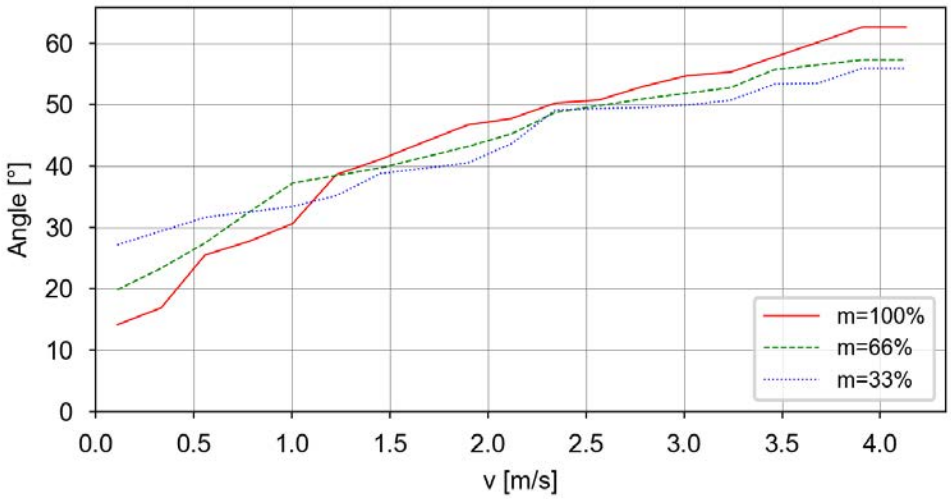
Category 1, Axis 1, Extension zone 1, stopping distance and stopping time

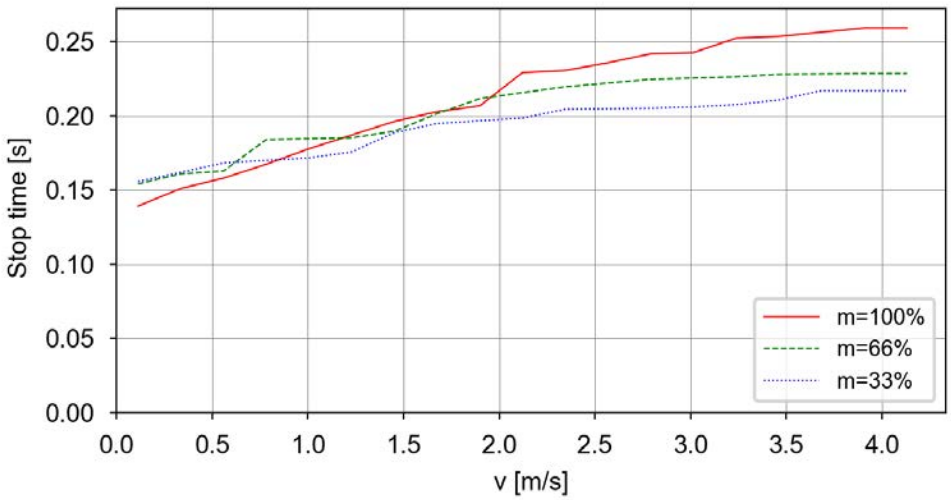




Continues on next page

Category 1, Axis 1, Extension zone 2, stopping distance and stopping time





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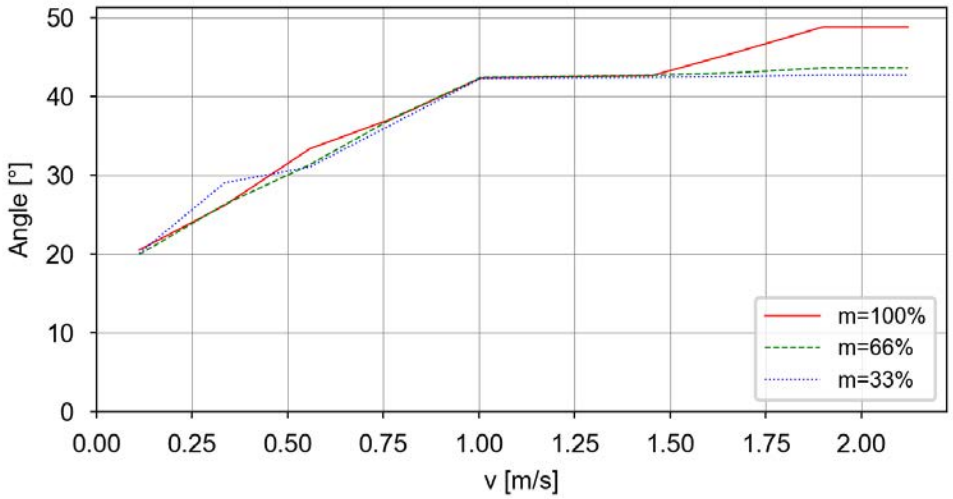
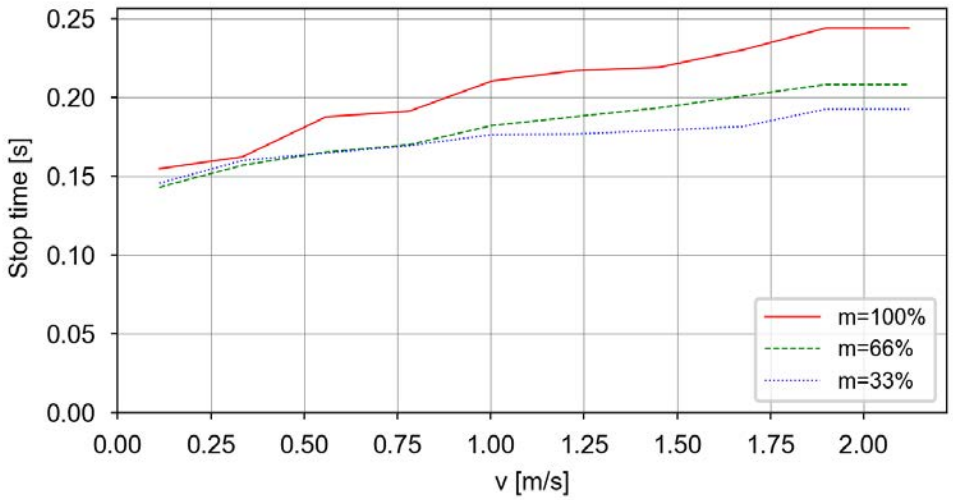
1.9.4 IRB 1200-7/0.7 Type B
Continued

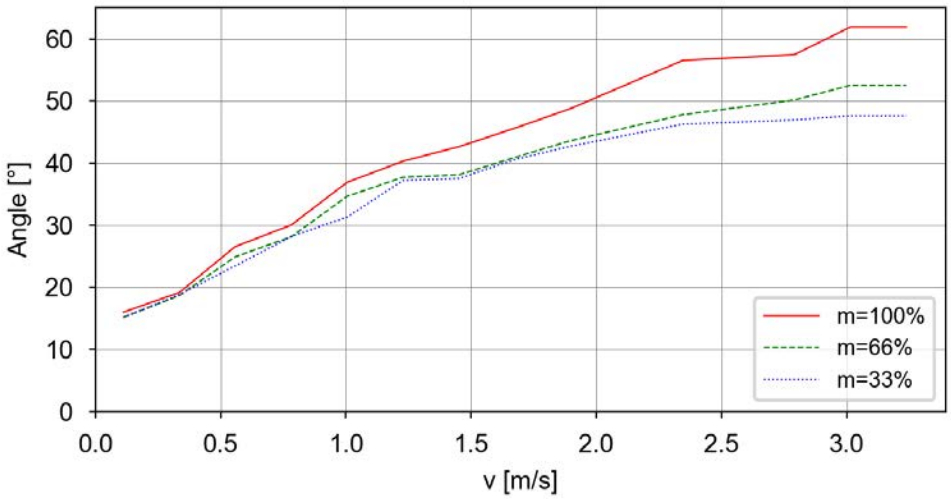
Category 1, Axis 2, Extension zone 0, stopping distance and stopping time

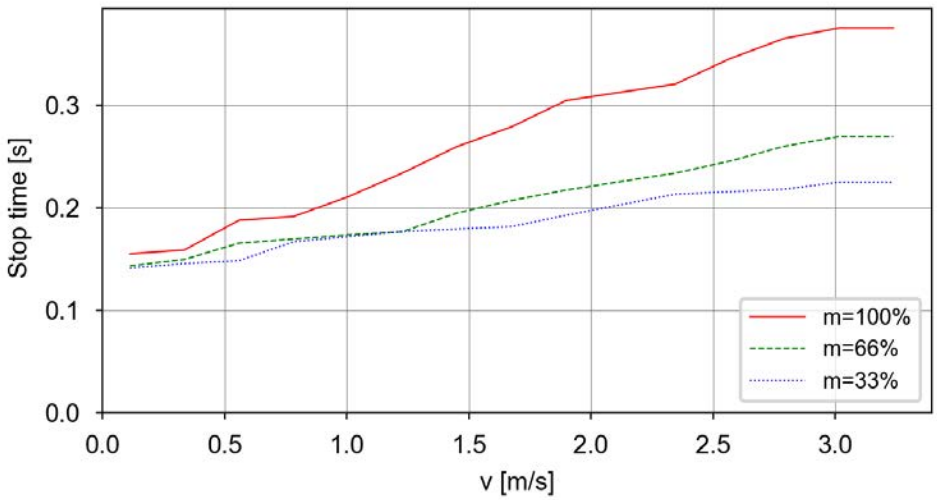




Continues on next page

Category 1, Axis 2, Extension zone 1, stopping distance and stopping time





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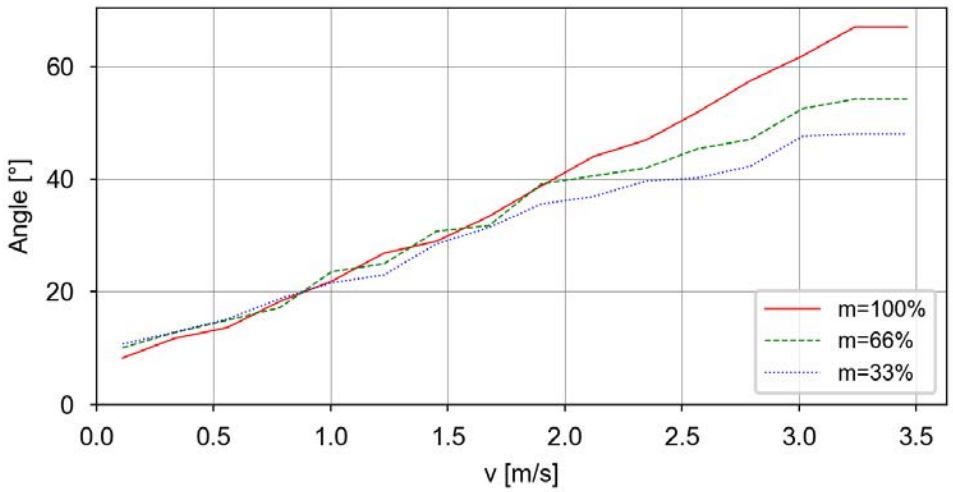
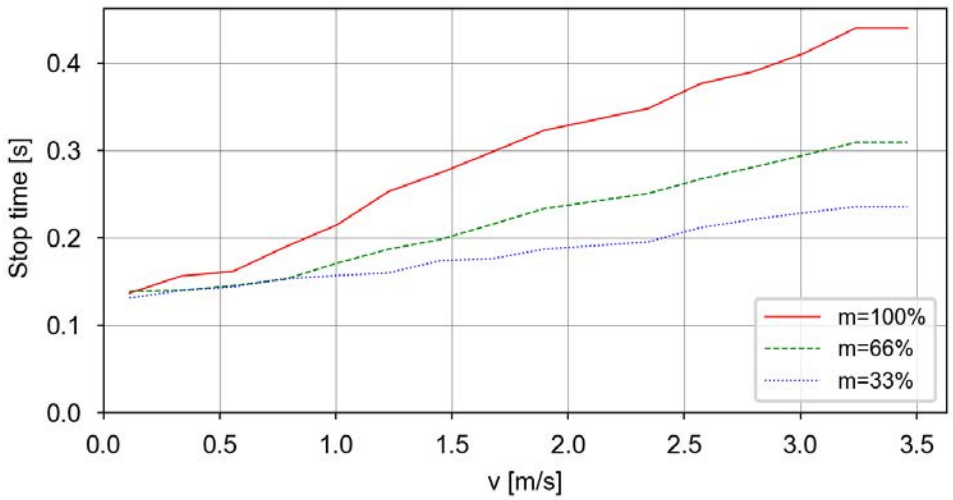
1.9.4 IRB 1200-7/0.7 Type B
Continued

Category 1, Axis 2, Extension zone 2, stopping distance and stopping time





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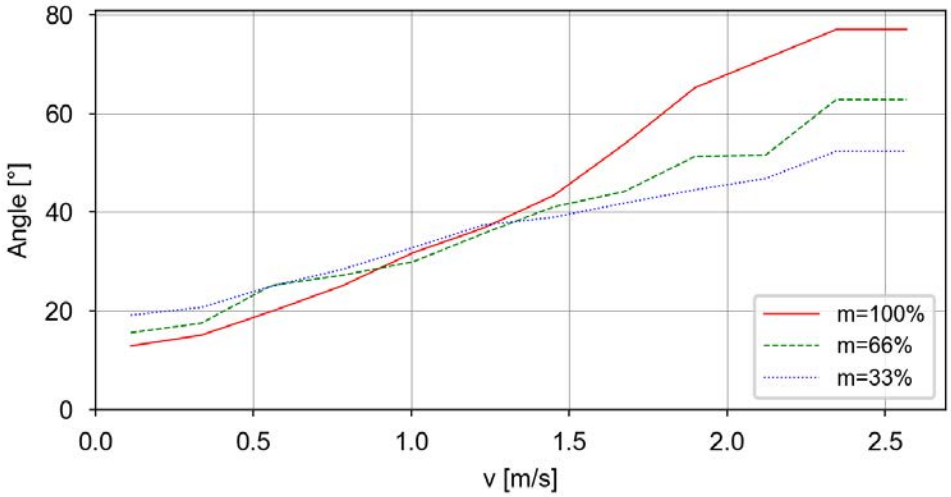
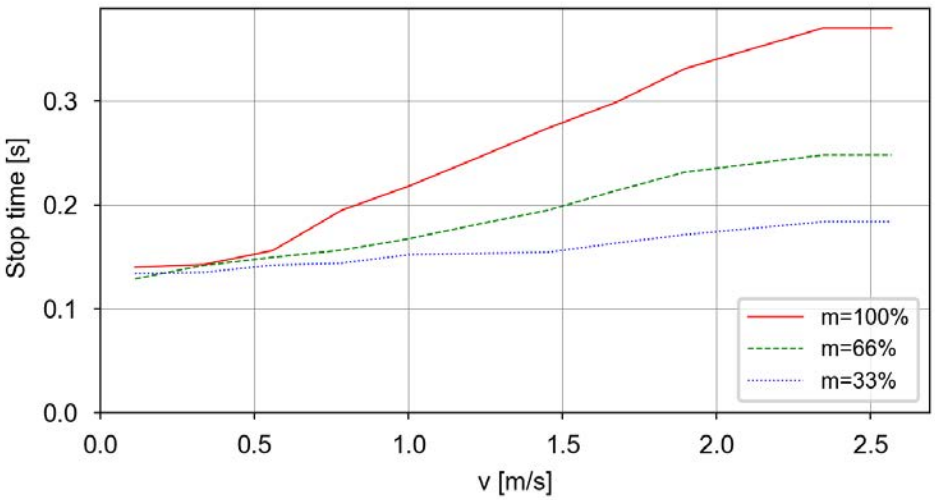
Category 1, Axis 3, Extension zone 0, stopping distance and stopping time





1.9.5 IRB 1200-7/0.9 Type B

Used tooldata

```
PERS tooldata P100:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [7, [0, 0,
     100], [1, 0, 0, 0], 0.012, 0.012, 0.012]];
PERS tooldata P66:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [4.7, [0,
     0, 67], [1, 0, 0, 0], 0.0052, 0.0052, 0.0052]];
PERS tooldata P33:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [2.3, [0,
     0, 33], [1, 0, 0, 0], 0.0013, 0.0013, 0.0013]];
```

Category 0

The following table describes the stopping distance and time for category 0 stop.

Axis	Distance	Stop time
1	42.3°	0.22 s
2	37.3°	0.24 s
3	43.4°	0.22 s

Category 1, extension zones

For definitions of the zones, see *Extension zones on page 59*.

The zone border is the mounting interface location for axis 2 and axis 3.

Axis 1

Zone border	Axis 2	Axis 3
z0-z1	-42°	42°
z1-z2	6°	-6°

Axis 2

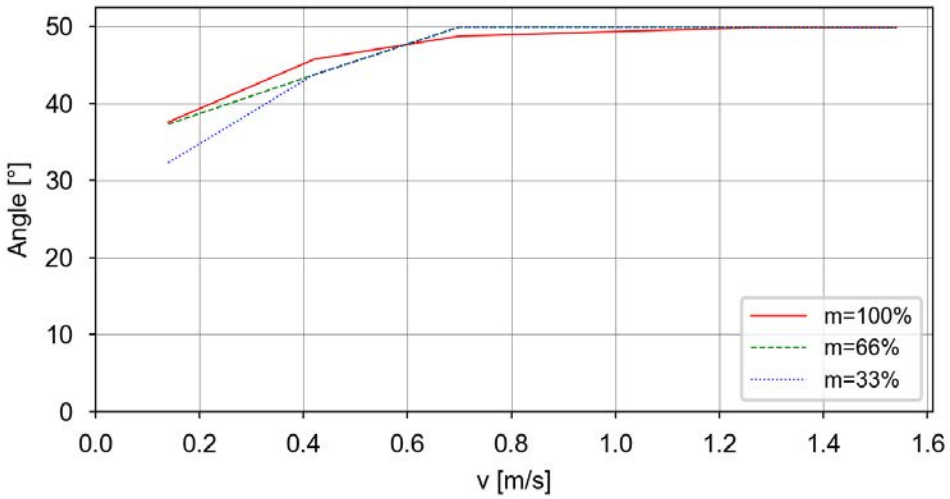
Zone border	Axis 2	Axis 3
z0-z1	48°	30°
z1-z2	90°	-30°

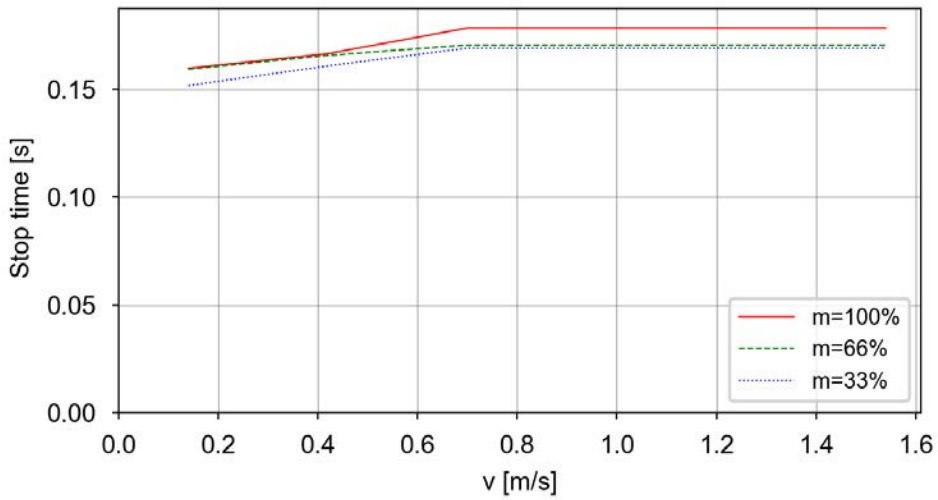
Axis 3

Only one zone exists.

Continues on next page

Category 1, Axis 1, Extension zone 0, stopping distance and stopping time

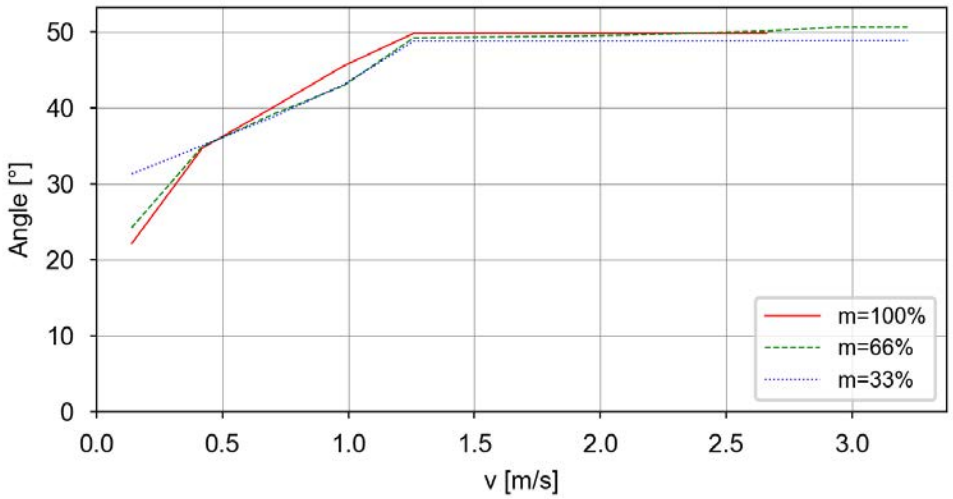


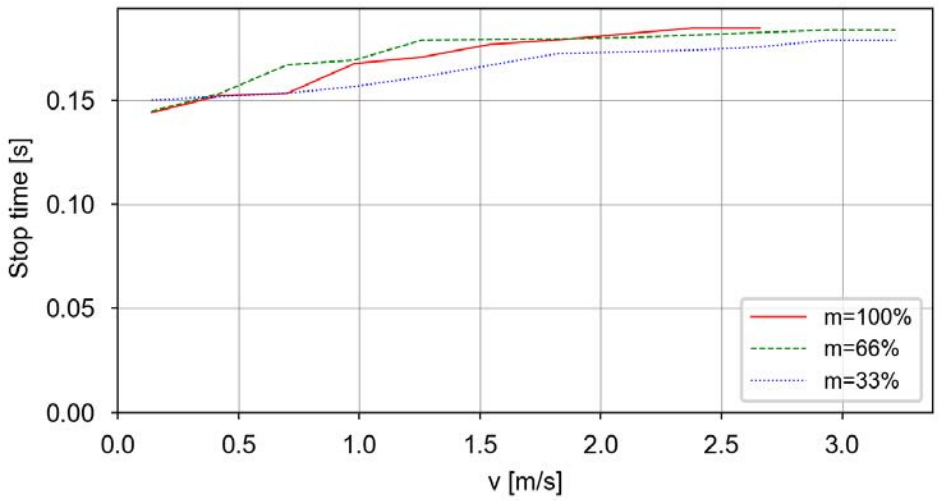


Continues on next page

1.9.5 IRB 1200-7/0.9 Type B
Continued

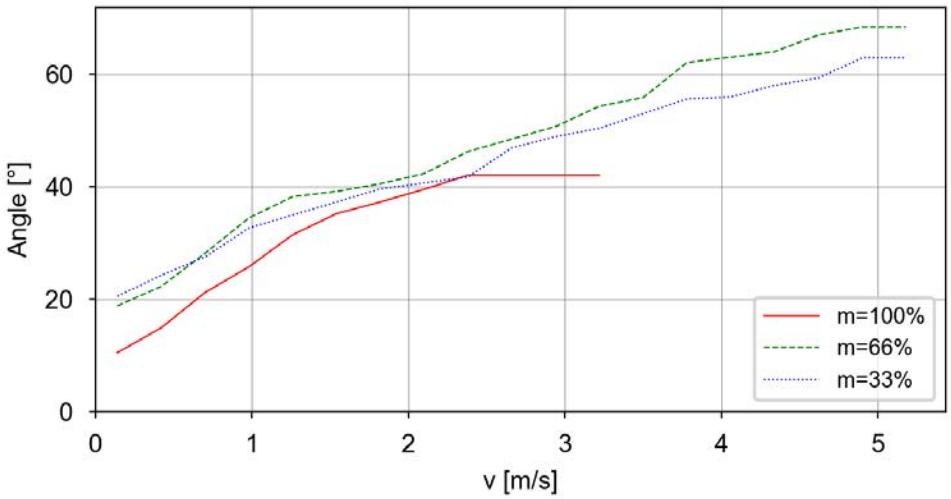
Category 1, Axis 1, Extension zone 1, stopping distance and stopping time

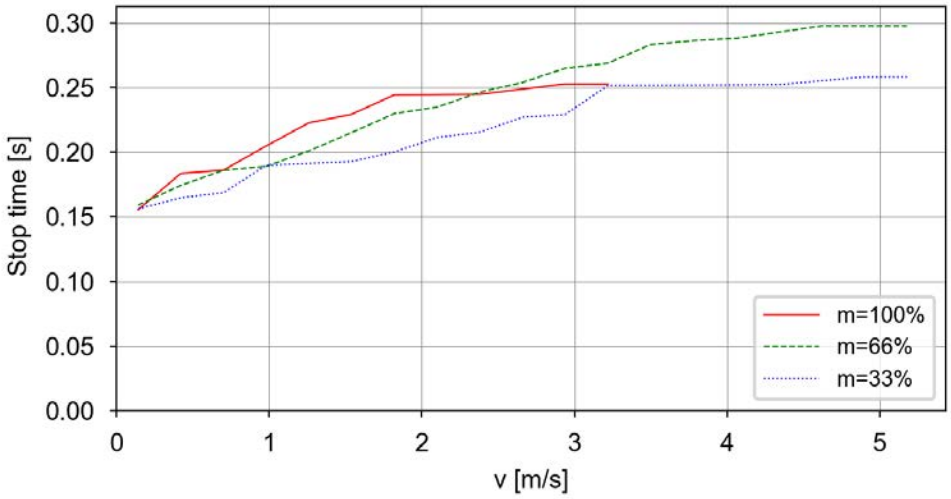




Continues on next page

Category 1, Axis 1, Extension zone 2, stopping distance and stopping time

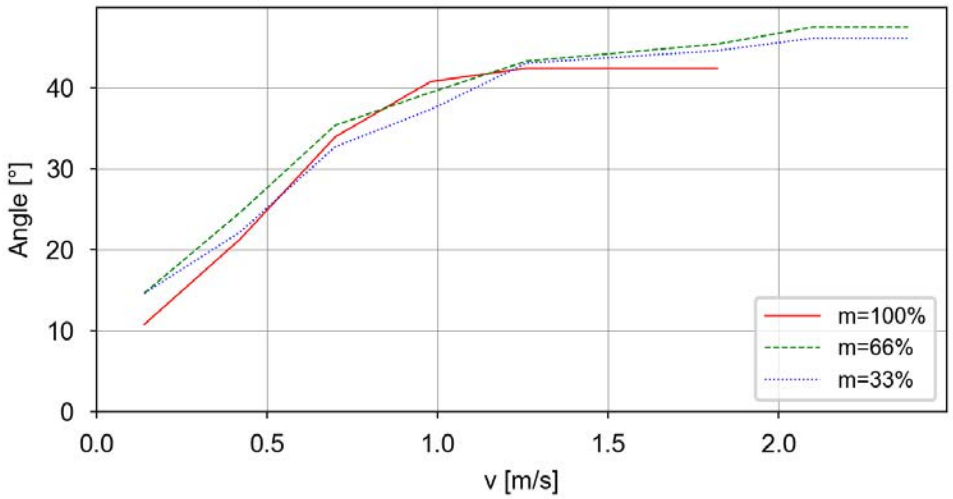


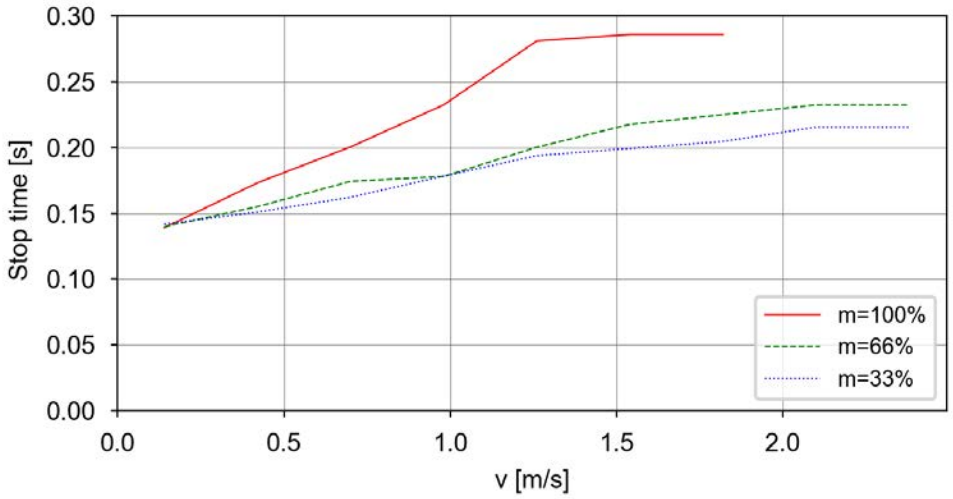


Continues on next page

1.9.5 IRB 1200-7/0.9 Type B
Continued

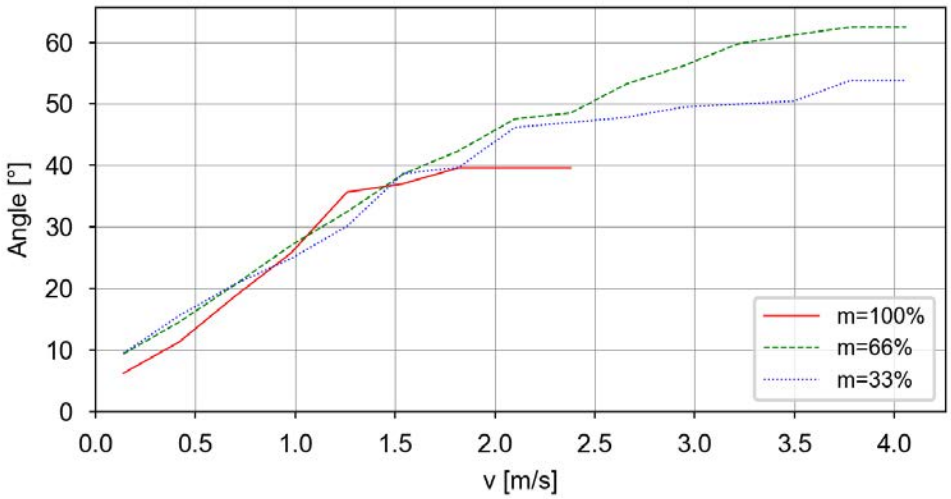
Category 1, Axis 2, Extension zone 0, stopping distance and stopping time

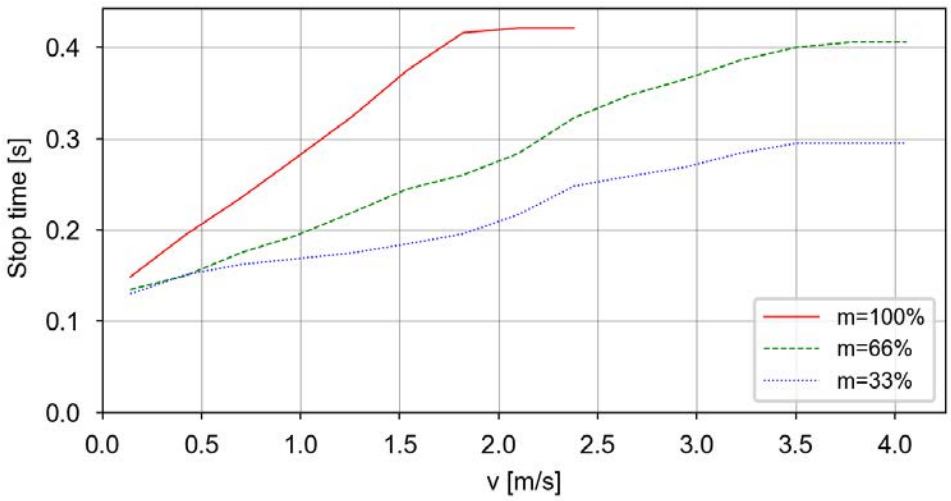




Continues on next page

Category 1, Axis 2, Extension zone 1, stopping distance and stopping time





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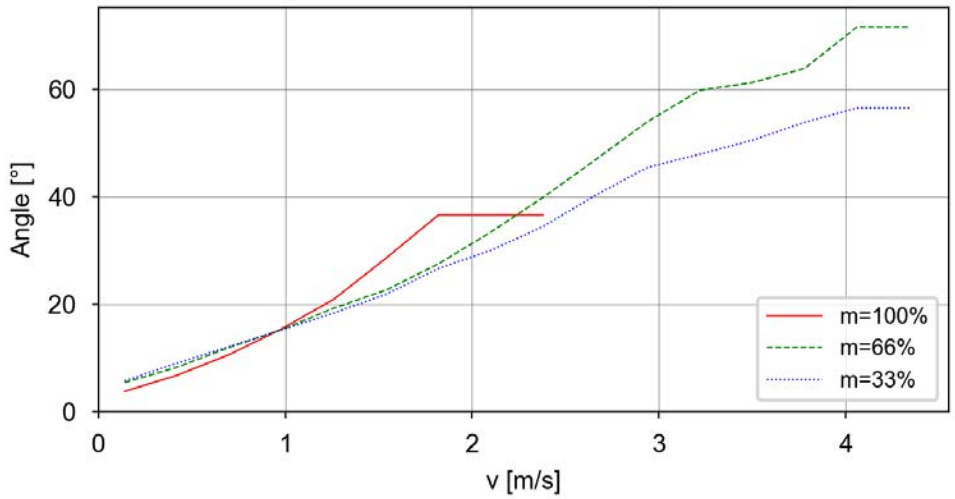
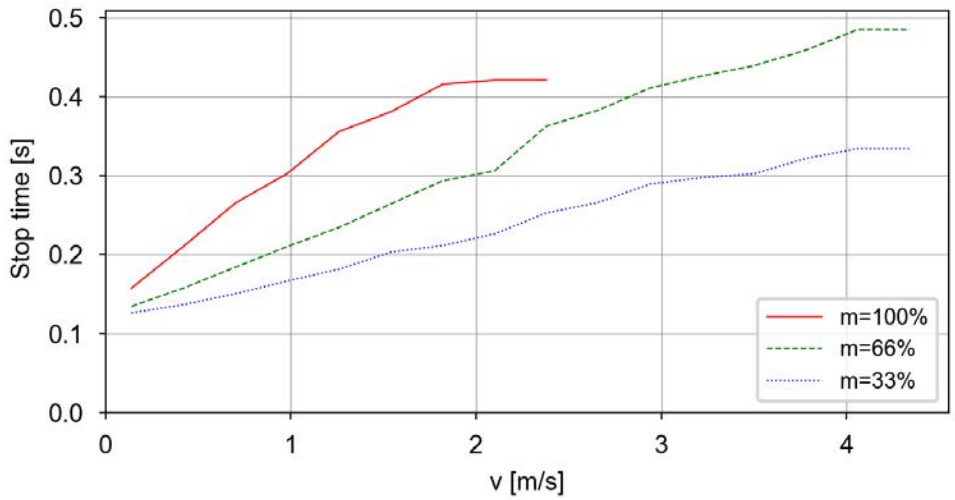
1.9.5 IRB 1200-7/0.9 Type B
Continued

Category 1, Axis 2, Extension zone 2, stopping distance and stopping time





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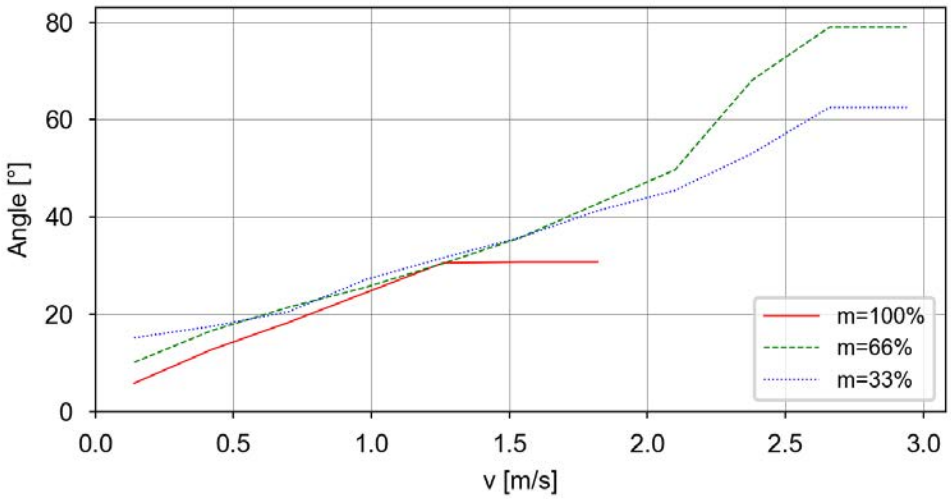
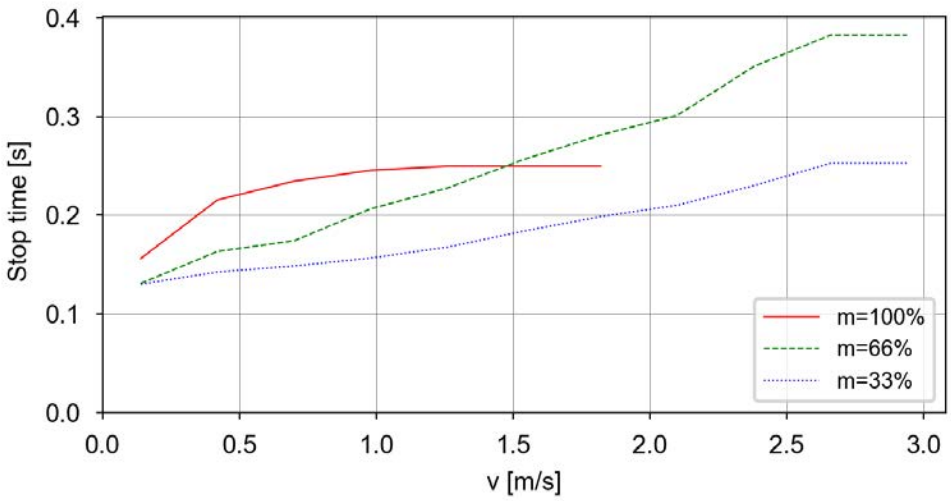
Category 1, Axis 3, Extension zone 0, stopping distance and stopping time



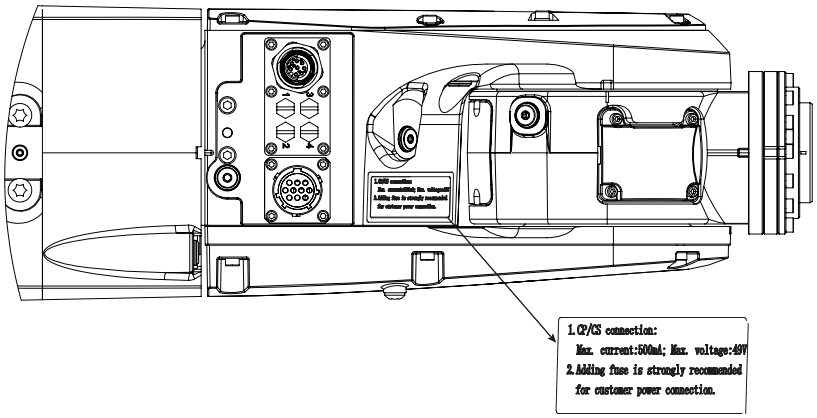


1.10 Customer connections

Introduction to customer connections

The cables for customer connection are integrated in the robot and the connectors are placed on the tubular housing (upper arm) and one at the base. There is one connector R4.CP/CS at the tubular housing. Corresponding connector R1.CP/CS is located at the base.

It is recommended to use a fuse protector for customer connection; otherwise, application overload will burn out the CP/CS cables in the robot. Detailed information about the CP/CS connection is provided in a warning label on the tubular housing.



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There is also connections for Ethernet, one connector R4.Ethernet at the tubular housing and the corresponding connector R1.Ethernet located at the base.

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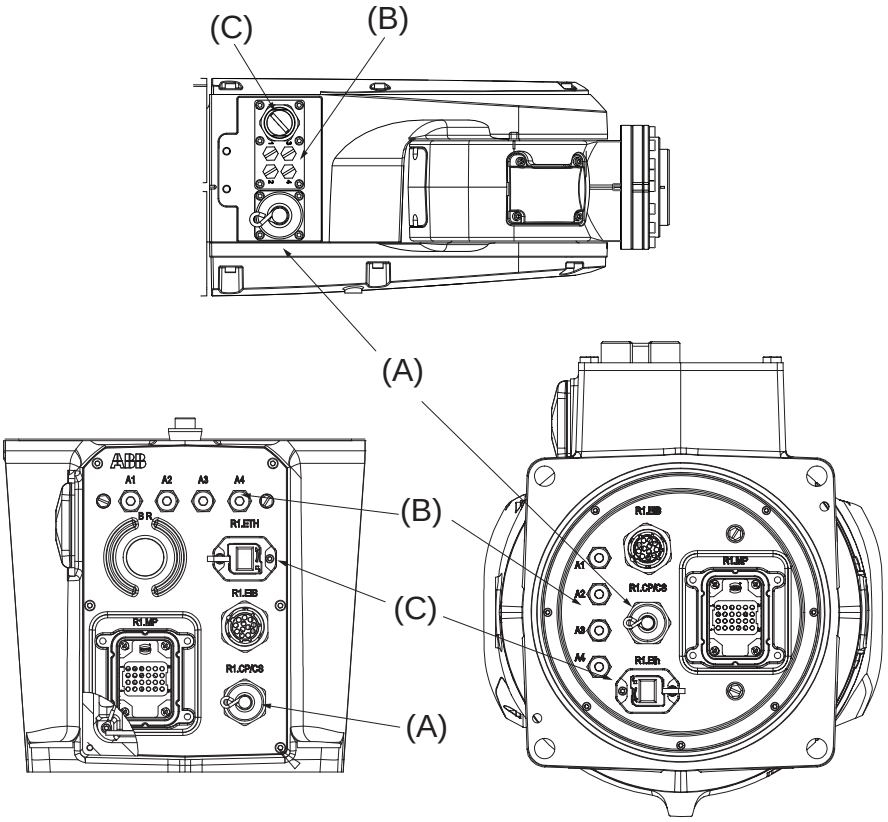
Hose for compressed air is also integrated into the manipulator. There are 4 inlets at the base (R1/8”) and 4 outlets (M5) on the tubular housing.



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Position	Connection	Description	Number	Value
A	(R1)R4.CP/CS	Customer power/signal	10	49 V, 500 mA
B	Air	Max. 5 bar	4	Outer diameter of air hose: 4 mm
C	(R1)R4.Ethernet	Customer Ethernet	8	100/10 Base-TX

Connectors

The tables describes the connectors on base and tubular housing (upper arm).

Connectors, base

Position	Description	Art. no.
Robot	Pin connector 10p, bulkhead	3HAC022117-002
Customer connector	Connector set R1.CP/CS	3HAC037038-001

Connectors, tubular housing

Position	Description	Art. no.
Robot	Socket connector 10p, flange mounted	3HAC023624-002
Customer connector	Connector set R3.CP/CS	3HAC037070-001

Continues on next page

1.10 Customer connections
Continued

Air, connector

Position	Description	Art. no.
Robot	4xM5	
Customer cable	Air connector	3HAC032049-001

2 Specification of variants and options

2.1 Introduction to variants and options

General

The different variants and options for the IRB 1200 are described in the following sections. The same option numbers are used here as in the specification form.

The variants and options related to the robot controller are described in the product specification for the controller.

2.2 Manipulator

Manipulator variants

Option	Type	Handling capacity (kg)	Reach (m)
3300-54	IRB 1200	7	0.7
3300-55	IRB 1200	5	0.9
3300-117	IRB 1200	7	0.9

Manipulator color

Option	Description	RAL code[i]
209-202	ABB Graphite White std Standard color	RAL 7035
209-2	ABB white standard	RAL 9003
209-1	ABB orange standard	NCS 2070-Y60R

[i] The colors can differ depending on supplier and the material on which the paint is applied.

Manipulator protection

Option	Description
3350-400	Base 40, IP40
3350-670	Base 67, IP67
3351-3	Clean Room 3
3352-10	Foundry Plus2 67, IP67
3353-1	Hygiene 67 REQUIRES: Under the base [3309-1], and Food Grade Lubrication [3310-1]. Not together with IRB 1200-7/0.9 [3300-117].

Note

Base 40 includes IP40, according to standard IEC 60529.

Base 67 includes IP67, according to standard IEC 60529.

Clean Room class 3 includes ISO class 3 standard, according to DIN EN ISO 14644-1, -14.

Foundry Plus 2 [3352-10]

ABB Foundry Plus 2 makes your entire robot IP67 compliant, from base to wrist meaning that the electrical compartments are sealed against liquid and solid contaminants. But it takes more than IP67 to ensure long-term trouble-free operation and long service life.

ABB Foundry Plus 2 robots are unique due to their improved resistance to corrosion and capability to withstand high pressure steam washing. No other foundry robots are up to this task today. See *Protection type Foundry Plus 2 on page 10* for a complete description.

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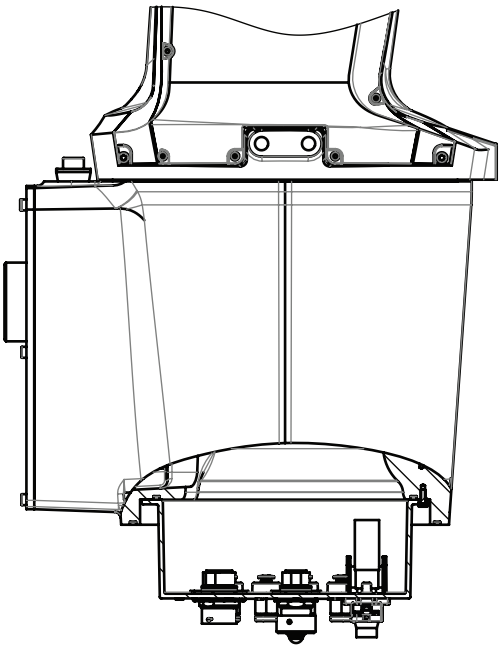
Food grade lubrication

Option	Description
3310-1	Food Graded NSF H1, REQUIRES: Hygienic [3353-1]. Not together with IRB 1200-7/0.9 [3300-117].

Robot cabling routing

Option	Description
3309-1	Under the base
3309-2	From side of base



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Media & Communication

When 3303-1 Parallel & Air is selected then 3304-1 and 3305-1 options are activated for selecting.

When 3303-2 Ethernet, Parallel, Air is selected then 3304-1,3305-1,3306-1 and 3307-1 are activated for selecting.

Option	Type	Description
3303-1	Parallel & Air	Includes customer power CP and customer signals CS + air.
3303-2	Ethernet, Parallel, Air	Includes CP, CS + air + Ethernet (PROFINET).

Limitations

The option 3303-1 Parallel & Air can not be selected with option 3353-1 Hygiene 67.

Continues on next page

Connector kits base

Option	Description
3330-2	CP/CS bus, Proc 1 base

Connector kits Upper arm

Option	Description
3336-1	Upper arm

Warranty

For the selected period of time, ABB will provide spare parts and labor to repair or replace the non-conforming portion of the equipment without additional charges. During that period, it is required to have a yearly *Preventative Maintenance* according to ABB manuals to be performed by ABB. If due to customer restrains no data can be analyzed with ABB Connected Services for robots with OmniCore controllers, and ABB has to travel to site, travel expenses are not covered. The *Extended Warranty* period always starts on the day of warranty expiration. Warranty Conditions apply as defined in the *Terms & Conditions*.

Note

This description above is not applicable for option *Stock warranty* [438-8]

Option	Type	Description
438-1	Standard warranty	Standard warranty is 12 months from *Customer Delivery Date* or latest 18 months after *Factory Shipment Date*, whichever occurs first. Warranty terms and conditions apply.
438-2	Standard warranty + 12 months	Standard warranty extended with 12 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-4	Standard warranty + 18 months	Standard warranty extended with 18 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-5	Standard warranty + 24 months	Standard warranty extended with 24 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-6	Standard warranty + 6 months	Standard warranty extended with 6 months from end date of the standard warranty. Warranty terms and conditions apply.
438-7	Standard warranty + 30 months	Standard warranty extended with 30 months from end date of the standard warranty. Warranty terms and conditions apply.

Continues on next page

Option	Type	Description
438-8	Stock warranty	Maximum 6 months postponed start of standard warranty, starting from factory shipment date. Note that no claims will be accepted for warranties that occurred before the end of stock warranty. Standard warranty commences automatically after 6 months from *Factory Shipment Date* or from activation date of standard warranty in WebConfig.  **Note** Special conditions are applicable, see *Robotics Warranty Directives*.

2.3 Floor cables

Manipulator cable - Straight

Option	Lengths
3200-1	3 m
3200-2	7 m
3200-3	15 m

Connection of parallell communication

Required 3303-1 Parallel & Air or 3303-2 Ethernet, Parallel, Air.

Option	Lengths
3201-1	3 m
3201-2	7 m
3201-3	15 m

Connection of Ethernet

Required 3303-2 Ethernet, Parallel, Air and occupies 1 Ethernet port.

Option	Lengths
3202-2	7 m
3202-3	15 m

Mains cable

Option	Lengths	Description
3203-1	EU mains cable, 3 m	Cable assembly with CEE7/VII line-side plug
3203-5	CN mains cable, 3 m	Cable assembly with CPCS-CCC line-side plug
3203-6	AU mains cable, 3 m	Cable assembly with AS/NZS 3112 line-side
3203-7	All regions cable, 5 m	Cable assembly without line-side plug

3 Accessories

General

There is a range of tools and equipment available.

Basic software and software options for robot and PC

For more information, see *Application manual - Controller software OmniCore*, *Product specification - OmniCore C line* and *Product specification - OmniCore E line*.

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Index

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